ral Need-

exchange covers every requirement from a as a roll of tape or a pair of pliers. Yet you uality in every respect—and, because of our e priced with the lowest. We show here a d to send you complete catalogs on request.

ic Magneto Monophones bring to the rural modern design.

with ringer, induction coil and 2-bar gen- special generator and 2500-ohm ringer.)

. Our automatic switchboards for small features at new low cost.

chboard, enclosed in steel cabinet.

agneto Switchboards are outstanding values hey are built to withstand the hardest, tough-

witchboard, with 5 cord circuits and 15 ith 12 cord circuits and 100 line circuits.)

products embody exclusive advantages in experience manufacturing protection equip-

5-amp. fibre fuses and Type 2105 dis- minal.)

ectric exchange accessories include testing other product required for the proper oper-

ange use, is shown in illustration; together , for either indoor or outdoor use.)

ave every small exchange owner or manager power, we believe you will find our prices r your copy of our complete supply catalog.

lete rebuilding service on telephones and facture. We invite your inquiries.

ELECTRIC

ECTRICAL ENGINEERS, DESIGNERS AND CONSULTANTS

ssessions

1033 W. Van Buren Street, Chicago, U. S. A.

SALES COMPANY, LIMITED

A *Modern* BATTERY!

Philco Floté in Steel-Glass 46 V 1056 AH Battery with 4 End Cells — Butler, Pa., Strowger Equipped Exchange.

Flote' in Steel-Glass

The progressive management and engineers of the Peoples Telephone Corporation, Butler, Pa., were quick to see the advantages of floating operation and the necessity of a reliable Philco Floté in steel-glass sprayproof battery designed for their needs. This modern installation combines ample reserve with long battery life and greatly reduced maintenance.

FLOTE' IN STEEL-GLASS CONSTRUCTION

Chemical—**Floté cells maintain a higher C. E. M. F. throughout their long life—and, therefore, require and take 60% as much current (and water) as conventional designs. Floté life is *DOUBLE* that of the ordinary battery.**

Mechanical—**Spray-proof Steel-Glass construction supports the plates on molded ribs and wedges the element in monobloc form, lengthening battery life and insuring trouble free economical service.**

PHILCO BATTERY DIVISION

TIOGA & C STREETS PHILADELPHIA, PA.

OFFICES IN PRINCIPAL CITIES

Telephony

The Journal of the Telephone Industry

★

Vol. 116 **May 27, 1939** **No. 21**

SMALL EXCHANGE CONSTRUCTION DEVELOPMENTS
By Foster L. Stanley 13

IN THE NATION'S CAPITAL—*By Francis X. Welch* 17

THE OPERATORS' CORNER—*By Mayme Workman* 19

BUILDING A MODERN RURAL TELEPHONE LINE—*By Ray Blain* 20

RURAL PROBLEMS IN IOWA CAN BE SOLVED—*By R. A. Phillips* 24

LOCATING AND CLEARING RURAL TELEPHONE TROUBLES
By Ray Blain 27

CONFERENCE OF STROMBERG-CARLSON'S SALES REPRESENTATIVES 36

"*TELEPHONY'S*" ENGINEERING DATA—*By B. C. Burden* 46

COMING CONVENTIONS 18
BEST STORY OF THE WEEK—WHAT'S YOURS? 34
WITH THE MANUFACTURERS 40
COMMISSION AND COURT ACTIVITIES 43
OBITUARIES 47

Published by
TELEPHONY PUBLISHING CORP.
608 So. Dearborn Street, CHICAGO
Telephone Wabash 8604

H. D. FARGO, President and Treasurer
S. R. EDWARDS, Editor and Secretary
H. D. FARGO, JR., Vice-President and Advertising Manager
D. C. SORENSEN, Western Advertising Manager

Subscription — 10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

SMALL EXCHANGE

Construction Developments

By Foster L. Stanley
Plant Extension Engineer, Indiana Bell Telephone Co.

***HOW AND WHEN** can plant and operating economies be profitably introduced? Ordinary reconstruction jobs offer opportunities for removing hazardous conditions, for making savings in construction and operation of the plant, and for improving the service by utilizing latest materials, equipment and methods. Investigate new developments in tools, poles and wire to ascertain what is best of available materials. Address presented before recent convention of Indiana Telephone Association*

THERE are in Indiana approximately 365 separate telephone companies operating 801 central offices and 503,700 telephones. About one-fourth of these telephones are in rural and small communities; and it is my purpose to discuss some of the relatively new developments in telephone construction, materials, and equipment that may be applied in these smaller exchanges and which should assist us in doing a better job at less cost.

With conditions changing as they have during the past several years, the problem of operating these small exchanges on an economical basis has changed and, as these problems confront the industry, there is a continuing effort to develop those instrumentalities and methods which will improve the service and at the same time effect improvement in the construction and operating costs.

While the solution of the small exchange problem may involve many considerations, I have attempted in this discussion to deal only with some of these that have to do with plant and operating economies and as to how and when such economies can be profitably introduced into the plant.

The search for those items of construction which will assist in the operation of the rural or small office has received increased impetus within the last several years as the problem of economical operation has become more acute and as the rebuilding and rehabilitation work of these plants has become necessary.

During the depression periods there has been very little need for plant extensions, and the maintenance and rehabilitation work has usually been held to a minimum. As these activities are revived there is an opportunity, afforded by relatively recent developments, to improve the service and to make savings in construction and operating costs.

In localities where major damages—caused by fires, floods, and storms—wipe out installations, these can often be replaced with a more economical type of plant, thus offering an opportunity to improve maintenance and service conditions.

The rebuilding of plant necessitated through public improvement projects—such as highway widening and rural electrification—even though requiring expenditures which are not revenue-producing on the part of the telephone companies, may be utilized to improve maintenance and service conditions.

Where it becomes necessary or advisable to replace plant, no matter how small the job, it may be improved by forethought. Plant might be so constructed that it will last for years with very little maintenance; but such construction may be prohibitive in cost. So it is advisable to select materials and construction that will provide good dependable service with a reasonable balance between cost and upkeep.

These reconstruction jobs may offer opportunities for removing hazardous conditions and for making savings in the construction and operation of the plant and for improving the service.

When rebuilding plant, consideration might well be given to the possibilities of common battery operation, to the elimination of grounded circuits by making them metallic, to the purchase or improvement of service lines, and to a reduction of the number of parties on heavily-loaded rural lines.

Through such rebuilding operations it is possible to effect transmission improvement through the elimination of high-resistance joints, by arranging for proper tree clearance and better separation, and by utilizing transposition schemes. In planning the replacing plant, recent developments in long-span construction, rubber-covered buried wire and the use of cable to replace the heavier lines, should be considered.

The possibilities of introducing such improvements should be studied and the construction and material selected that will do the best job consistent with the requirements. In analyzing a proposed project an engineer or manager usually asks himself these questions:

Why do it at all?

Why do it now?

Why do it this way or that way?

Assuming that the answer to the first two of these questions is obvious and that something must be done without delay, the third question remains: as to how best to do the job before us. And the answer to this question can only be made by knowing what is best that is available.

In considering a new or replacing rural line, it is advisable to survey and forecast the future requirements

along the proposed route. This can best be accomplished by a canvass of the area.

Farm houses, in this territory, are usually separated by some distance and a relatively large amount of plant is required to serve them. There is also the added problem caused by economic conditions — where many have discontinued their service, making it more difficult to serve the remaining customers. Where additional stations can be forecast along the route, it is best to provide a margin on the proposed lines rather than fully load all lines initially.

The result of the canvass may be a determining factor in the choice of the type of construction. Due weight should be given to the use of as much of the existing plant as possible, because a high proportion of the existing investment represents the labor of placing; and where plant can be used in place without creating undue maintenance hazards and poor service, it is advisable to make use of it.

Where wholesale replacement is involved, the salvageable timber, crossarms, etc., may be used effectively in improving other portions of the plant.

In studying relief, replacement plans or extensions to the plant, it is advisable to investigate the more recent developments available, some of which will be mentioned.

Most of us are familiar with the use of cable in conduit and in the air and as to where such construction is applicable, but the practice of burying cable without conduit is gaining favor as a construction method.

Jute-Wrapped, Lead-Sheathed Buried Cable

Some companies have buried lead sheath for a number of years with little or no protection to the sheath. I know of one company which has in its plant some buried lead sheath that has been in the ground for 24 years—and it is still giving good service. However, there is now available, at a small additional cost, jute-wrapped lead-sheathed cable that affords protection where the soil contains harmful chemical elements. Where more severe conditions warrant, this cable can be armored with metal tape under the jute covering.

The cost in place and the maintenance of jute-wrapped cable, when buried under favorable conditions of weather and soil, will usually be less than aerial cable plant. It can be trenched or plowed into place. A cable plow is available for laying this cable in the ground without trenching operations.

The cable is usually placed to a depth of 18 to 24 inches and, if placed out of the way of digging and grading operations, it should serve for many years, with little upkeep expense, in sections not infested by gophers or other earth-burrowing animals which in some parts of the country are a menace to buried plant.

This cable is available in standard gauges and sizes. Where rebuilding or road improvements force the moving of pole lines, the possibilities for using this type of construction should be investigated. Where lines can be rerouted and two or more

Closeup view of the plow in the ground showing plowed-in wire and the reel of wire attached to plow.

pole lines consolidated into one cable route, such construction may become even more attractive.

In the effort to reduce rural outside plant costs, there has been recently introduced two chief advances: One in the form of rubber-covered paired wire suitable for burying directly in the ground, and the other high-strength steel wire for use in long-span open-wire construction.

The urge to put telephone wires underground is as old as the telephone business. This has been possible to a large extent in the more congested areas where underground cable could be placed; but where only a few pairs were involved, the problems involving first cost, maintenance, and service life have heretofore stood in the way.

Rubber-Covered Paired Wire for Buried Rural Circuits

The recent development of a rubber insulation that promises to meet the buried wire problem, offers hopes that such construction can be introduced into our plants. The type of wire now being manufactured for this purpose, is composed of parallel conductors of No. 17 gauge copper. The wire is sheathed in a rubber compound that is generally impervious to the elements which will surround it but is materially affected by prolonged exposure to the sunlight.

The most favorable location along the highways for this type of construction is to place the wire in that portion of the road shoulder which bears the vegetation, for it is here that the soil is loosely packed and moist, thus facilitating the placing and maintenance of the wire.

As it is being used this buried rural wire finds its greatest value in extensions or replacement of lines carrying one or two pairs, or in localities subject to recurring storm or flood hazards. Except for burrowing rodents—not much of a factor in Indiana—and the danger of disturbance due to highway construction, it appears that conditions in Indiana are generally favorable to its use.

In localities where recurring floods make it practically impossible to maintain aerial plant, as is found along the river bottoms in southern Indiana, this type of construction may be a solution. However, as yet there has not been a sufficient test of such applications to determine its suitableness to meet such conditions under prolonged soaking after the insulation has aged.

In areas where lightning has previously been a serious factor in the maintenance of plant, the use of a shield wire buried with the telephone wire may be found effective in minimizing the occurrence and extent of lightning troubles.

For shielding, a soft-copper, alloy-coated wire is placed underground with the buried pairs and terminated at the protector ground. The shield wire provides a low resistance path to ground and tends to equalize the potential between the buried wire conductors and the surrounding earth.

It is important to have moisture-proof joints in this type of buried wire, and its installation should not be considered unless the joints can be vulcanized. An inexpensive vulcanizing process has been developed for use in making the splices.

It is advisable to introduce buried loading coils in the circuit if lengths are used which would impair transmission, for when used in subscribers' loops the loss is about five times that of the same length of No. 12 iron wire; but with proper loading, this can be reduced to about twice the loss of ordinary line wire.

Installations thus far of this buried wire are showing gratifying results. Considering the storm-proof nature of such plant and the elimination of periodic tree trimming, it offers attractive possibilities.

The use of high-strength steel wire with long spans is another economical solution to rural plant costs which appears to be coming more into general use. Where the building or major replacement of rural lines is necessary, its use should be considered. High-strength steel wire costs about 25 per cent more than the galvanized wire now in general use and has about twice the tensile strength.

High-Strength Steel Wire in Long-Span Construction

With this added strength in the line wire it is possible to effect economies in pole-line construction. Span lengths up to 450 feet will function satisfactorily in medium storm-frequented areas and as much as 350 feet in sections subject to more severe weather conditions.

Generally speaking, 75 to 85 per cent of the cost of a two or four-wire rural line is in the pole plant; and with increased span lengths of the proportion just mentioned, the pole line structure can be materially reduced. The use of long spans reduces the number of pole holes to be dug and the number of poles to be set.

Pole class and sizes can be kept to a minimum, and satisfactory operation has resulted without an increase in the pole class or height over that used in short-span construction. The shorter the pole, the shallower is the pole hole required; and the material, freight, delivery and installation costs vary with height and class of pole used.

This reduction in pole structure has considerable to offer towards an economical solution of the rural problem, especially on fairly straight right-of-way where corners and side guys are minimized.

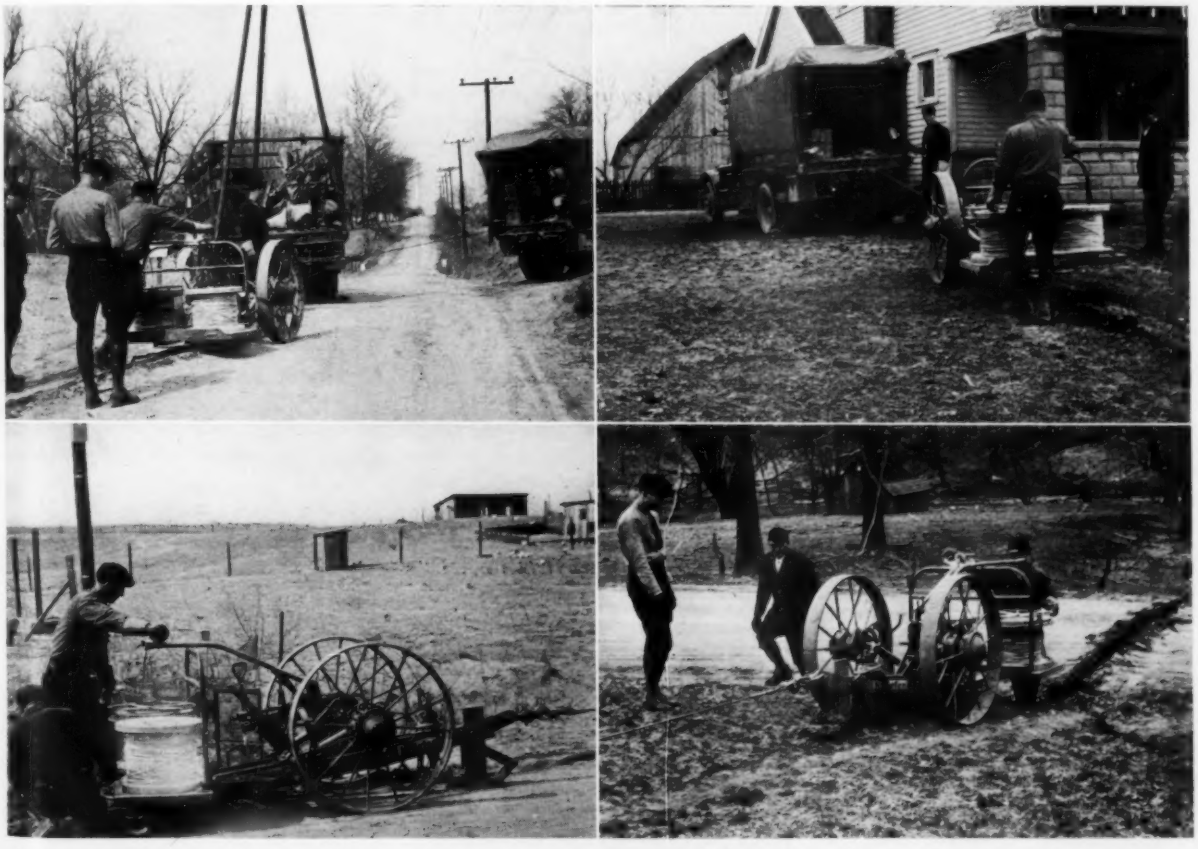
High-strength steel wire can be pulled taut — and a 300-foot span with a sag of 24 inches at 60 degrees is usually satisfactory where an ordinary line wire of two-thirds this length requires the same amount of sag. Very often heavy ice and wind loading cause the normally-used rural line wire to be stressed beyond its elastic limit and to break.

In this connection it is interesting to note that if a 350-foot span length of No. .109 high-strength wire having a mid-span clearance of nine feet from the ground, were to be loaded with ice until it touches the ground, the elongation would be less than ½ of 1 per cent—and only a very small part of this elongation would represent permanent stretch which would remain after melting of the ice.

The additional load and tension require heavier guying — approximately 2½ times the strength of ordinary guying. Good joints, made more effective by the use of compression sleeves, are practically necessary in long-span construction.

The present type insulators are satisfactory, but it is advisable to use transposition brackets on these long spans, instead of single-pin transpositions, to prevent swinging contact troubles. With proper design and construction, advantage can be taken of long spans up to one crossarm of wire.

The average resistance of this new steel wire is 73 ohms per loop



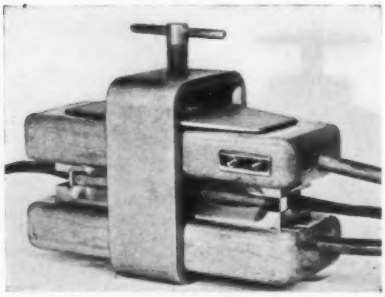
In Daviess County near Washington, Ind., the Indiana Bell construction men installed 15 miles of buried telephone wire with a special deep tillage plow. UPPER LEFT: With a winch line on one truck run through a block on another, the plow is pulled across a road on a 20-degree arc and up to a farmhouse. UPPER RIGHT: Plowing-in a drop to a farm home. LOWER LEFT: General view of the plow as it was pulled along the edge of the road; a terminal is on the pole at the left. LOWER RIGHT: Under the watchful eyes of Paul Shockency (left), supervisor, and R. Miller, foreman, the plow cuts across the road and up a steep bank on its way to bury another drop to a farmhouse.

mile as compared with 65 ohms per loop mile of commonly-used line wire. So this difference will ordinarily not be a factor in rural construction.

The maintenance on long-span open-wire lines should be somewhat less than with low-strength wire because, with the improved characteristics of this wire, there should be less wire-stretching and breakage from trees and ice.

With the foregoing factors in mind, it will undoubtedly be agreed that this type of construction deserves serious considerations where an existing rural line has reached the point where a major rebuild is necessary.

Since the pole plant represents such an important part of the plant investment in the smaller exchanges,



Tool used in vulcanizing rubber covering of joints in buried wire.

it is advisable to place treated poles. Properly treated poles have, in this territory, a long life expectancy and have demonstrated their value.

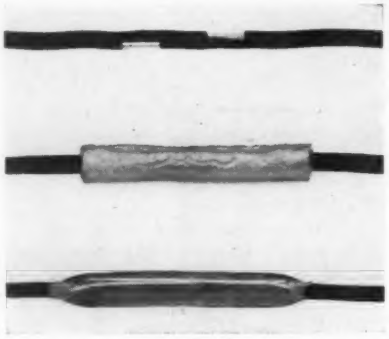
The amount of strength built into the pole line is an important factor. It is frequently found that the heavier lines are underbuilt. This is probably due, in many instances, to failure in anticipating future requirements when the lines were originally constructed.

Pole lines in the northern portion of Indiana must be built heavier than those in the southern portion if they are to withstand the recurring heavy sleet storms which frequent this area.

Proper tools for doing telephone work are now generally available at reasonable cost. To economically place and maintain plant, proper tools are indispensable and, when purchased, they should be used properly and carefully cared for. When not in use they should be so located, mounted and in repair as to be readily available when required.

There have been noticeable improvements in subscriber's station apparatus and installation costs. The manufacturers have built into their new sets many improvements, and the new designs are attractive and appealing. Where combined sets are used—sets with ringer and coils combined with handset mountings in a single piece of apparatus—an installation and maintenance advantage is gained.

There are on the market today



In splicing buried wire, the joints are staggered. The splice is covered with raw rubber to make it weatherproof and then the covering is vulcanized.

many good types of common battery central office equipments made to meet the various needs of small offices and equipped for manual or dial operation.

Through developments it is now possible to operate long rural lines on a dial basis and to give a very satisfactory grade of service. Thus within the past few years community dial offices of various types have been installed in Indiana.

Small unattended dial offices throughout the country are giving a very satisfactory grade of service and offer encouraging possibilities in the effort to improve the service and reduce operating costs.

The dial equipment, as now manufactured, makes it unnecessary to provide for constant attendance and supervision; and the equipment is so constructed that it will operate satisfactorily under rather severe temperature changes, with only occasional maintenance attention.

One type of construction suitable for new unattended dial exchange buildings.

Where dial offices are unattended, subscribers must call by number and the toll operating must be provided at some nearby office where operators are available. It is also usually advisable to arrange for information and repair service calls to be routed to a nearby office.

The manufacturers of this equipment have it so designed that the installation is simple. Most of the wiring, assembling and adjustment is done prior to shipment so that only minor cabling, assembling and adjustment are required at the time of installation.

Another feature that adds to the attractiveness of unattended dial offices is that these installations can be placed in small, relatively inexpensive buildings or in rented space that would not be suitable for a manual installation. Thus the expense of light, heat, water, and janitor service can be materially reduced.

A view of long-span construction in which the new extra high strength line wire is used.

In the Nation's Capital

by Francis X. Welch

Special Washington, D. C., Correspondent for TELEPHONY

***A BRIGHTER OUTLOOK** for exemption of telephone exchanges than at any previous time is indicated after developments last week in Washington on amendment of Wage-Hour law. . . . Hearings commenced by Senate subcommittee in an investigation of the telegraph industry*

IF THIS were an ordinary session of Congress and if this were a normal Democratic majority in control of it, the United States Independent Telephone Association would have reason to feel pretty blue over the action of Chairman Norton in declining to bring up her wage-hour amendment bill under her promised motion for a "suspension of the rules" on May 15.

But it should be hastily added that the chances for relief of the small Independents from burdensome restrictions of federal wage-hour standards are brighter than ever at this writing. Reason: This is *not* an ordinary session of Congress and this is the most *abnormal* party majority which has appeared on Capitol Hill since Cleveland and Bryan fell out over the currency question back in the gay nineties.

An ordinary session of Congress would be winding up its business about this time in order to get out of Washington by the first of June or shortly thereafter. This would mean that any legislation that was not reported on the floor ready for action by the end of April, would have a pretty poor chance of final consideration, barring urgent White House intervention or some other special circumstances.

When Congress met last January there was no reason to believe that this session would run much past June. For that reason your correspondent emphasized in this department the necessity for getting early momentum behind telephone legislation, if it were going to get anywhere this session. But we all reckoned without Messrs. Hitler, Mussolini, and a few other gentlemen in Europe who have thrown Congressional schedules into such disorder that it is exceedingly doubtful if Congress can call it a day by July 15—the latest "deadline" being discussed by the administration wheelhorses on Capitol Hill.

OF COURSE, the administration would like Congress to get out of Washington much sooner for a good many other reasons beside foreign policy; not the least of which happens to be what a conservative coalition may do to the New Deal labor legislation. But there are just enough strong-willed isolationists in Congress and just enough distrust of what the President might do with the national foreign policy if another European crisis should develop, to keep Congress here all summer. Indeed, the administration will have to display a lot more tact and humility than it has so far if it is to avoid having that very thing happen.

Naturally, this gives us just that much more time for progress and development on domestic legislation in which the telephone industry is interested. That brings us to a consideration of the abnormal character of the Democratic leadership. Never in this writer's period in Washington has he seen such a leaderless Congress or a majority so split up into conflicting and overlapping blocs and factions.

Top-heavy majorities usually have a tendency to develop internal factionalism. Yet the last Congress was much more Democratic than this one and the party generally followed its recognized leadership. In this Congress it sometimes seems that the recognized party leaders have less control over what is going on than some of the members whom they are supposed to be leading.

Take, for example, the majority leader in the Senate—"Dear Alben" Barkley of Kentucky. Compared to the masterful leadership of his predecessor, the late Senator Robinson of Arkansas, Senator Barkley cuts a pretty sorry figure. He walks around like a frightened little country schoolteacher trying to preserve order over a class of big and wild mountain boys who had never been to school before in their lives. Nobody seems to pay much attention to him or to his orders.

But in all fairness this is not Senator Barkley's fault by any means. The trouble is not the leadership but the following. Senator Barkley at times seems to be the victim of his own loyalty to the administration.

This was exemplified several weeks ago when President Roosevelt practically took the administration leadership over relief legislation out of his hands and gave it to Senator Pepper of Florida; simply because Senator Barkley had been disposed to dicker for a reasonable compromise with the opposition which he knew he could obtain, while Senator Pepper was willing to go down fighting for New Deal objectives which he knew himself were hopeless.

Naturally, when the Senate membership cannot be sure that Senator Barkley has the White House behind him, it is not likely to take his leadership too seriously.

On the House side the situation is pretty much the same. The New Dealers threw their caps in the air

when former Chairman O'Connor turned up missing at this session as the sole victim of the "purge," and an administration zealot, Representative Sabbath of Chicago, succeeded him as chairman of the powerful rules committee.

Yet everybody in Washington knows that Representative Sabbath is the chairman of the House rules committee in name only. Where do the newspaper men go when they want to find out what is going to happen in the rules committee? They go to the office of Representative Cox of Georgia, who is running that committee for all intents and purposes; and he is running it about the same way that former Representative O'Connor ran it.

THIS BRINGS us back to the House labor committee which has or had control over the amendments to amend the wage-hour law, in which the United States Independent Telephone Association has such an important stake. Chairman Norton does control her own committee by a narrow margin. Furthermore, she is loyal to the administration and is willing to act on orders from the White House board of strategy, even though it results in some personal embarrassment.

Such was the situation on May 15 when everybody expected that Chairman Norton would make her motion to "suspend the rules" on her wage-hour amendment bill, as she had promised to do several days before. The purpose of this maneuver was to cut off debate and prevent the opposition from amending the Norton bill from the floor.

In plain words, what happened was that the administration simply lost its nerve. It takes a two-thirds vote to obtain a "suspension of the rules." Over the week-end the farm bloc, together with several other groups which wanted to carry the amendments to the wage-hour law much farther than Chairman Norton or the administration were willing to allow, corralled enough votes to beat the Norton motion.

So instead of going out on the floor and taking its licking, the administration, by a last minute order, turned around and tried to run back into the labor committee hole. But at this point Representative Cox of Georgia blocked the hole by pointing out that once the House labor committee had reported a bill to the floor of the House, it lost technical control over such legislation.

Other members warned that if the House allowed the bill to get back into Mrs. Norton's committee it would never see it again for the rest of the session. Probably the farm bloc in concert with Representative Cox's rules committee, will make the next important move in the conflict—possibly by approving a bill of its own.

Meanwhile one recent development on the Independent telephone industry's front may sever its cause from the more controversial proposed agricultural amendments to the wage-hour law. Mrs. Norton tried to split the opposition to her original bill by introducing another bill of her own which left out the agricultural section, but retained the 500-station telephone exemption clause. However, now that the opposition has Chairman Norton "on the run," the word which goes around Washington is that this bill is not likely to get very far unless it is picked up as a consolation prize, in the event that the opposition is unable to make further headway under its own steam.

MORE important from the Independent telephone industry's viewpoint is the bill introduced by the leader of the Senate farm bloc, Senator John Miller, Democrat of Arkansas. A companion bill was introduced by Representative Barden of North Carolina in the lower house.

The new Miller-Barden bill increases the telephone exchange exemption under the Wage-Hour law to 800 stations. But it also unites this relief in the same bill with the controversial labor exemptions. The strategy is obvious. The farm bloc wants the support of the friends of the telephone industry, and it is likely to get it, too.

The chances for enactment of the Miller-Barden bill seem pretty bright, although it would not be surprising if the Senate should vote on it before the House. The only fly in the ointment is the threat by President Roosevelt to veto any legislation amending the federal Wage-Hour law which goes substantially beyond the amendments agreed to by the House labor committee.

Most Washington observers are inclined to believe that the President said this mostly for effect—that is, in order to keep the farm bloc from running wild. As far as telephone exemptions are concerned, it is not believed likely that he would quibble over the difference between 500 and 800 stations and veto a bill in the latter form.

But the agricultural amendment in the Miller-Barden bill is a horse of a different color. Fortunately, as previously observed, there will probably be enough time left during the current session for the telephone industry to get through some form of special relief, even if the President should veto a law in some such form as the Miller-Barden bill.

The whole situation is moving quite lively and will bear close watching for several weeks to come. The most we can say at present is to repeat that the outlook for the Independent industry is even brighter today than it was when Chairman Norton had apparent control of the situation.

AT THIS writing, there seems to be a conspiracy of silence at both ends of Pennsylvania Avenue as to what is going to be done with the FCC, which now has enough money to run only for another six weeks. However, this is just the lull before the storm.

In the very near future—probably with the return of Chairman McNinch from a short rest—some move will be made to give the FCC enough money for another year's board and keep. Nor will there be any of the extensive alterations in the premises indicated at the beginning of the session. The FCC will likely continue to do business at the old stand for another 12 months, although Chairman McNinch may have a few additional ideas about interior decoration.

COMING CONVENTIONS

The Illinois Telephone Association, Pere-Marquette Hotel, Peoria, June 7 and 8.

Wisconsin Independent Telephone Association, Loraine Hotel, Madison, June 13.

Wisconsin State Telephone Association and Wisconsin Locally Owned Telephone Group, Park Hotel, Madison, June 13-15.

Washington Independent Telephone Association, Hotel Monte Cristo, Everett, June 23 and 24.

Oregon Independent Telephone Association, Portland Hotel, Portland, June 26.

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 29 and 30.

Michigan Independent Telephone Association, Hotel Olds, Lansing, July 26 and 27.

However, there was some development on another front, which should be of collateral interest to the telephone industry. Early this week a subcommittee of the Senate interstate commerce committee, headed by Senator Minton of Indiana, began hearings on Senator Wheeler's resolution to investigate the telegraph industry.

There is no chance that this special industrial investigation will grow into a general FCC investigation, although it may conceivably include some point of contact with the telephone industry before it is over with. This is not to suggest that there will be no further movement in the direction of an FCC investigation. It merely means that these two respective investigations — telegraph and FCC—are entirely distinct breeds of bloodhounds, and will be developed independently of each other, if at all.

What Senator Wheeler is principally interested in is to show up the economic and regulatory complications of the telegraph industry, and possibly to produce some formula for putting through the long-discussed merger of the two principal national telegraph systems.

Naturally, such a line of inquiry runs right into the old, old snag of labor opposition. Labor forces are all in favor of one big strong telegraph industry instead of two undernourished competing systems. But they don't want anybody to lose his job in the process. On the other hand, a merger without provisions for payroll economy as well as economy of capital investment and other operating costs is likely to be about as unsatisfactory as ½ of 1 per cent beer.

Be that as it may, the Minton subcommittee is going to listen to all sides of the question, labor included. Whether anything new or anything especially significant will come of it is a highly debatable question.

SOCIAL Washington is all agog over the forthcoming visit of Their Britannic Majesties, George VI and the queen consort, Elizabeth. British secret service men have already dropped into town and have looked over the White House, where the royal couple will pass their brief visit with the President, from top to bottom. Among other arrangements that might interest telephone people will be special connections between the White House and the British Embassy, which is about two miles away on the fashionable new "Embassy Row" strip of Massachusetts Avenue.

So if anyone gets the bright idea of trying to call the king on the telephone while he is staying at the White House, it will do him no good. The call will be referred to the British Embassy, which will supervise all of His Majesty's communications while the royal couple is in Washington.

The Operators' Corner

By MAYME WORKMAN
Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

TELEPHONE'S place in the entertainment field.—Series No. 367

THE TELEPHONE'S indispensability in our modern business and social life is a commonly-known fact. The world today without the telephone would be at a standstill. However, the telephone also serves a definite purpose in another field of a different nature—the field of entertainment.

The radio programs, which furnish nation-wide entertainment, frequently resort to the use of the telephone in presenting their plays and skits. Imagine Amos and Andy's dilemma without the telephone! Few of their programs are presented without a telephone call, incoming or outgoing: the Kingfish calls the Battle Axe; Andy receives a call from his favorite lady friend of the moment, or we hear his answer to the call of the telephone bell, saying, "Andrew H. Brown, president, speaking"; Amos calls Ruby to inquire about the baby, etc.

Other radio programs find many uses for the telephone. We hear Rochester call Jack Benny; Gracie Allen talks to her Mother; and Lum and Abner make an announcement over the "party line."

On Major Bowes' amateur hour, the telephone is an important factor as thousands of people use the telephone to call and cast their vote for their favorite amateur. On one occasion, when an operator in Washington, D. C., appeared on his original amateur hour, Major Bowes paid tribute to all telephone operators. He said: "Telephone operators, as a rule, are not appreciated at their full value. They do a splendid job."

The Major is qualified to speak, for thousands of telephone calls are made—both in the different "honor cities" and in New York City—to register votes for the amateurs appearing on his program each week.

The use of the telephone in the entertainment field is not confined to the radio alone. On stage and screen, frequent use is made of the telephone. Before the invention of the telephone, actors had to resort to pantomime, or a remark in an aside, to interpret the meaning of certain parts of the drama. Not so today. The telephone bell rings, a conversation ensues, and the audience follows the play without the need of interpretation.

In entertainment, as well as in business and social life, the telephone serves a definite purpose.

Questions from Illinois Operators

1. How would you explain to a subscriber why a report charge is made on a station-to-station collect call when the charges are refused or there is no one there to accept the charge at that time?
2. If Information gives the report of NF, is it up to the originating operator or distant operator to find out if there is a telephone listed at the address before sending a messenger?
3. Is it necessary to put OK on an *out* ticket charged to a third number?
4. When you receive a WH report, should it be entered on back of ticket with the number following it?
5. Why does any collect call take a person-to-person rate?

The answers to these traffic questions are given on page 44.

Building A Modern

Rural Telephone Line

By RAY BLAIN

THE SELECTION of poles for rural line use should always receive careful consideration before construction of a new line or the rebuilding of an old one. The poles should be of a size adequate to carry the ultimate load of the line but need not be oversize. Neither need they be longer than is absolutely necessary to provide adequate clearance.

The higher a line is placed in the air, the greater will be the storm strain placed on it, ordinarily resulting in costlier maintenance. The use of poles of a much greater length than were actually required was a common fault in earlier days. Poles high enough to provide proper clearance must necessarily be used for all road crossings.

The timbers ordinarily used for telephone poles are: chestnut, western red cedar, northern or eastern white cedar and creosoted southern yellow pine. Ordinarily any of these timbers, which are locally available, will prove economical. Over a period of years wood treatment has been demonstrated as desirable and economical, and the use of untreated poles is now never recommended. Cedar poles usually have only the butts treated while the southern yellow pine are full-length treated. Pole producers will be found willing to explain their particular method of pole treatment and the results which may be expected from its use.

Poles should always be selected according to the ultimate load they will be required to carry. A one-circuit lead (two wires) need not have poles as large as one designed to carry three or four circuits. A 16 or 18-foot pole with a four or five-inch top will ordinarily prove adequate for a one-circuit lead in most sections of the country.

When a greater number of wires must be supported, and also to provide proper clearance, poles from 20 to 25-feet in length will probably be required. The longer the poles, the heavier they should be, due to the increased strain they will be required to carry.

Poles are ordinarily roofed and gained by the supplier at no extra cost. At the present time the one-cut roof is in common use. This is similar to a shed roof on a building as compared with the pointed roof formerly used for poles. Poles for a rural line usually require only one crossarm gain, and this should be bored for a through bolt.

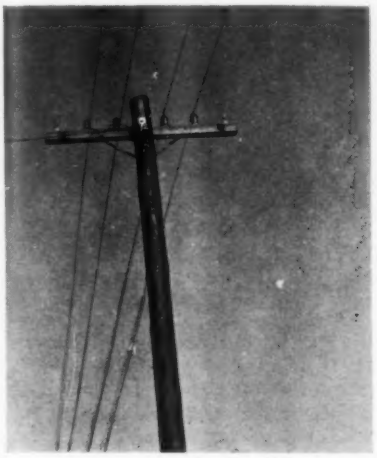
Full-treated poles should always be roofed and gained prior to treatment, to provide adequate protection. Care should also be taken to not damage treated poles with cant hooks or other tools during their erection. Any puncture of the treated surface may conduct moisture into the untreated interior and start decay.

Next in priority of importance after selecting poles is to make certain that they are set in the ground properly. The holes dug for poles should be of a size large enough to permit easy entrance and provide ample space for lining the poles properly.

When small poles are used, an eight-inch earth auger can often be used in some types of soils for digging the holes. When this method proves inadequate, a long-handled shovel, spoon and digging bar should be used. An ordinary tile spade with a six-foot iron pipe handle attached frequently proves valuable in the digging of holes for rural-line poles.

The digging of a pole hole is never an easy task, and there is always a tendency to end the hole several inches short of the specified depth. This practice weakens the line considerably and often offsets the advantages which should be gained from the use of good poles.

A 16 or 18-foot pole should be set at least 3½ feet in the ground; a 20-foot pole, four feet, and a 25-foot one at least five feet. Should a 50-foot pole be set for a railroad crossing, it should be placed in a hole seven feet deep. When poles are set in rocky soil, the holes may ordinarily have a depth of ½ to one foot less.



Twisted-pair drop wire run from an open lead to a house; note the drop dead-end on the pole and the special knob fixture on the side of crossarm near the end.

Pole setting is dangerous work and care should always be observed to avoid injury to workmen. Small poles up to 20 feet in length may ordinarily be picked-up and set in the hole by two or more men without the use of tools of any kind. One man can then hold the pole in line while it is being tamped solid.

When handling larger poles, pikes and a jenny should be used. Cant hooks should also be used to prevent the pole from turning while it is being raised. Pikes with the ends on the ground will also be found useful to hold the larger poles in line while they are being tamped in place. Crossarms, brackets and other fixtures should always be attached to poles before setting.

Tamping poles solid is of upmost importance, and this phase of the work should never be slighted. Only a small amount of dirt, say two or three shovelfuls, should be thrown into the hole at a time and well-tamped before more is added. Small sized tamps ordinarily prove more desirable for tamping around small poles used on rural lines. When a pole has been tamped well, level with the surface, loose earth should be piled around it to provide a bank about one foot in height. This provides ample dirt for settling and is protection against grass fires.

The side of a pole on which the crossarm mounts is known as its face. The first pole on either side of a corner should always be faced toward it. When a line curves around a corner, all poles should be faced toward its center. Each two poles in the straight section of the line should face toward each other. This arrangement of pole facing tends to equalize the strain in the line.

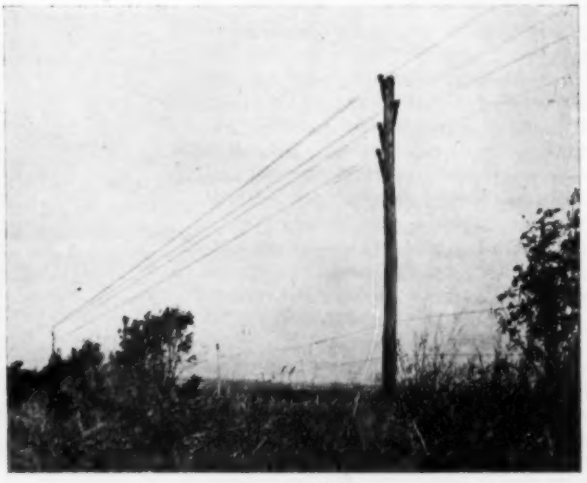
While the selection of poles and then their erection is important, this alone does not assure a lasting line; good guying must also be provided. Extra large poles are ordinarily selected for corners, and these should in all cases be well guyed to carry the extra strain.

A push brace is sometimes used instead of a down guy to support a pole.

Guys are usually of galvanized messenger strand. They are attached to the poles with eye-bolts and to the ground by an approved type patent anchor. Guys should be placed at all points where the side strain on the line has a tendency to pull a pole out of line with the others.

Storm guys, placed at fixed intervals along a line, will generally prove a good investment. These guys may be merely two side guys on a small lead, or an "H" fixture guyed four ways on a heavy lead. The location

Where space does not permit, a guy is extended across highway to a stub to which a down guy is attached.



Brackets properly arranged on a telephone pole provide the necessary clearance between wires.

of storm guys will depend to a great extent upon the type of line and the nature of the storms to which it is exposed.

When any section of a line is particularly exposed to the elements—such as when passing over a large hill—it should always receive special guying attention. Storm guying in severe climates should always be adequate as guys will prove more economical than the rebuilding of storm breaks.

In long-span rural line construction the new steel wire permits poles being spaced a long distance apart.

When space will not permit the installation of an ordinary down guy, it may be necessary to extend an overhead guy across a road to a stub where the down guy may be located. When this arrangement does not prove desirable, a push brace is often used.

Contrary to general belief the installation of push braces is still considered good practice for certain types of line. Tree guys should never be used when they can possibly be avoided, for the swaying of trees transmits a movement to the line that proves troublesome in some cases. When a down guy is exposed, it should be equipped with a suitable guard.

Poles of sufficient height should always be used to provide a proper clearance over all roads, railroads or power lines. While high poles can be used for this purpose, it is now common practice in many localities to dead-end the open wire on guyed poles each side of the obstruction, and install a suitable underground cable between them. Lightning protectors are placed on the open wire on each side of the underground dip. This arrangement is generally considered both easier to install and maintain than the high-pole overhead crossing. The satisfactory operation of the underground crossing has been made possible to a great extent by the improvement in lightning protectors. They really protect the cable and require very little maintenance.

The question of pole grounds is a frequently-debated subject. Some contend that they offer little, if any, protection, while others highly esteem them. It is believed, however, that they do offer considerable protection and should be used in sections of the country where lightning is severe and poles are damaged frequently by it.

The lowest-cost satisfactory method of installing these grounds is by attaching them to poles before setting. The ground wire should ordinarily be about No. 8 B.W.G., stapled along the pole from the roof to the butt. To provide a proper contact with the ground, it is a good plan to make a spiral of several turns of the wire and staple it to the butt of the pole. The wire should also extend at least a few inches above the high point of the roof on the pole.

Pole ground wires should be placed at fairly frequent intervals along a line, depending on the severity of the lightning in that particular locality. Ordinarily a good ground at each tenth pole will prove adequate in most localities.

The span length recommended for use on a rural line will depend to a large extent on the sleet loading of a particular locality and the type of wire used. Usually the span length will range from 150 feet in a heavy-loaded area to 300 feet in a light-loaded area, when ordinary types of wire are used.

When Copperweld steel or the new high tensile strength wire are used, the span length may be extended in some cases to a maximum of 500 feet with safety. However, when long-span construction is used, care should be taken to locate poles so as to provide proper ground clearance; special care should also be exercised in the building of good corners.

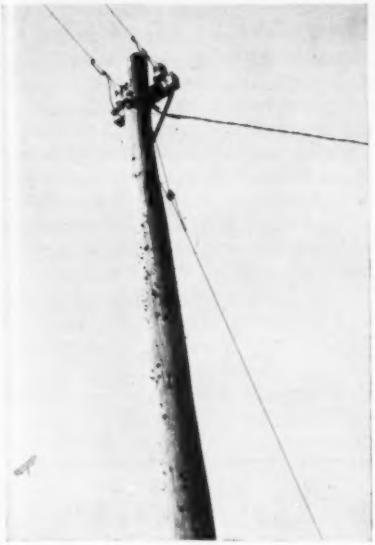
A recent new development in high-tensile-strength line wire is so revolutionary that it should prove of general interest to all telephone men. The specifications of this new wire are as follows:

Size B.W.G.	No. 12
Nominal diameter in inches	0.109
Minimum breaking strength (pounds)	1,213
Resistance per mile (ohms)	38.23
Approximate weight per mile (pounds)	170
Approximate weight per coil (pounds)	150
Approximate length per coil (feet)	4,659

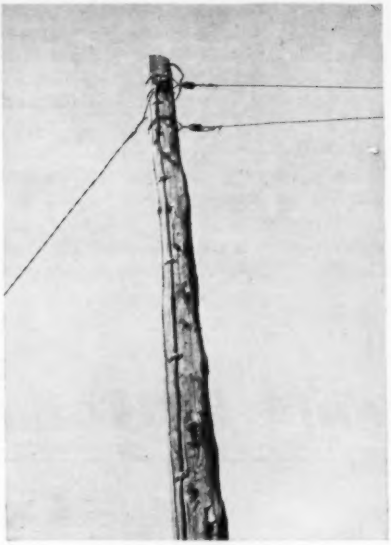
Numerous transmission tests conducted on this new wire indicate that it averages approximately 5 per cent lower transmission loss per mile than ordinary B.B. telephone wire of the same size. This increased efficiency, added to the fact that it has more than 2½ times the tensile strength of ordinary B.B. wire, makes it desirable and economical for use on long-span construction of rural lines. Maximum recommended span lengths vary from 350 feet in heavy-load areas to 500 feet in light-loaded districts.

The sags recommended for heavy and medium loading areas are such that the unloaded tensions in the spans will be approximately one-fifth

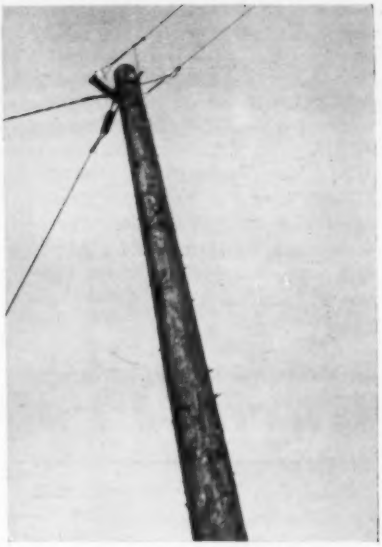
A good example of unusually long-span rural line construction. This span is 700 feet long; note the pole in the foreground and the other pole located in the distance near the farmhouse.



Good example of a dead-end on a two-pin crossarm; note the twisted-pair drop for the subscriber's telephone connection.



Strain insulators are often used to dead-end a rural line. In this illustration the cable is used for an underground crossing.



A new improvement for use in outside plant construction is an angle crossarm upon which rural lines are frequently dead-ended.

of the rated breaking strength of the wire, at minus 10 degrees Fahr. for heavy loading, at zero degrees for maximum loading for all span lengths. In light loaded areas the ratio of unloaded tensions to breaking strength is one-fourth, at zero degrees Fahr.

The following table indicates the range of span lengths as ordinarily recommended for B.B. wire as compared with those for the new high-tensile-strength wire in each loading area.

Loading Area	B.B. Wire	New High-Strength Wire
Heavy	0-150 ft.	200-350 ft.
Medium	0-225 ft.	300-450 ft.
Light	0-300 ft.	350-500 ft.

Space here will not permit covering the recommended sag tables in detail. However, a 350-foot span strung in a heavy-loaded area at 100 degrees F. should have a sag of 45.5 inches. This sag will reduce to 23.5 inches at minus 10 degrees F. A 500-foot span strung at 110 degrees F. in a light-loaded area, should have 71 inches sag. This sag will reduce to 38.5 inches zero degrees F.

Construction practices recommended for this new high-strength wire differ little from those used in ordinary rural line construction. However, when spans of over 200-feet in length are used, it is recommended that consideration be given to reinforcing the line wire at the supports by installing an armor tie. This special tie is made by covering the line wire with close wraps for the total distance it lies in the insulator between the start of the wraps of the regular tie on each side.

This tie has a number of important advantages: It tends to stiffen the line wire in the insulator groove and affords improved distribution of line-wire stresses at the supports; the tie wire acts as an armor over the line wire and protects it against abrasion caused by vibration and swaying; during periods of ice and wind loading, the armor tie secures the line wire firmly to the insulator. Special tie wires should be obtained from the manufacturer for use in making this armor tie.

Galvanized steel compression-type sleeves are recommended for all splicing of this new wire. This type of sleeve is made by several different manufacturers, who also supply the necessary tools for installing the sleeves, either by rolling or compressing.

Electrical connections between galvanized line wires and drop wires or bridle wires, should be made with light, compact connectors. Galvanized steel or aluminum bridging connectors are recommended for connecting steel to steel. Galvanized steel or aluminum connectors, with suitable spacers to provide separation between the steel and the copper or bronze wires, are recommended for connecting bronze or copper wires to galvanized line wires.

It is often necessary to extend a drop wire from the line across the highway to reach a subscriber. Ordinarily the pole will not have a height sufficient to provide proper clearance of the drop over the center of the highway. In such cases an extension to the pole of about four feet can be used to avoid the expense of an extra long pole.

A suitable angle-iron extension can be purchased for this purpose, which is bolted to the top of the regular pole. An attempt is made frequently to use a makeshift extension by bolting an old crossarm to the top of the pole. This method is not recommended in view of the low cost of the regular angle-iron extension which makes possible a much better job.

The use of a twisted pair or a parallel wire drop is recommended when this pole extension is used. The pole from which the drop breaks off from the line, should be guyed or keyed by placing a cross timber just below the surface of the ground to carry the added strain of the drop wire.

Wood brackets are commonly used on poles to support wires on rural lines. This is due to the fact that they generally prove more economical than crossarms because of the small number of wires required on the average line. The top of the first bracket is usually placed even with the low side of the roof of the pole. The top of the second bracket is then placed level with the bottom of the first, whether on the same or opposite sides of the pole. This arrangement should be carried out regardless of the number of brackets used, as it provides a necessary clearance of about 12 inches between wires.

When crossarms are used on rural lines, they are ordinarily either of the two, six or ten-pin types. The two-pin crossarms are now coming into general use by some companies to replace wood brackets. Some construction men make use of one crossarm brace, while others merely cut the gain extra deep and make the crossarms self-supporting.

A small two-pin angle iron crossarm has recently made its appearance and, from all present indications, bids well to become quite popular. So far this new crossarm has been used principally for dead-ending purposes, but no doubt its use will soon be extended for all rural line purposes.

The ordinary steel pin with wood cobb is used on this new crossarm. When more than two pins are required, a six-pin arm is generally installed. When this does not prove adequate, the 10-pin size is generally recommended.

The selection of suitable poles and then installing them properly in the line will prove a good investment for any telephone company. Any saving made by slighting this first cost will prove false economy, because it will be offset by higher maintenance costs later. The best in materials and construction methods always prove cheapest in the end.

Rural Problems In Iowa Can Be Solved

By R. A. PHILLIPS

Vice-President and General Manager, Central Electric & Telephone Co., Sioux City, Iowa

***ANALYSIS** of Independent industry in Iowa shows that success or failure depends entirely on ability to keep farm telephones in service at a fair and equitable rate. Conditions outlined which must be met in order to place adequate and satisfactory rural service on a profitable basis. Address before annual Iowa Independent telephone convention*

ANY CONSIDERATION or discussion of the rural problem of the Independent telephone industry in Iowa necessarily goes to the heart of our business and might well include all of our problems. I say this because the 802 Independent telephone exchanges in Iowa, operating 260,000 telephones mean an average telephone exchange of some 325 telephones.

While it is true we have a few relatively large Independent exchanges in the state, fundamentally our industry serves the small Iowa community, entirely agricultural in make-up and, of course, depending directly on agriculture for its livelihood and future.

While I do not have the exact figures as to the number of rural or farm telephones in Iowa, judging from development of the 53 exchanges our company operates in Iowa (which average in size about the same as for the state as a whole; namely, 325 telephones) it is apparent that more than 50 per cent of the telephones of a typical Iowa Independent telephone property are out in the country serving farmers.

This naturally makes the farmers' problem our problem, and we should be interested in anything and everything that, in any way, will assist or better the position of the farmer. Certainly, we are aware of the great amount of thought and effort being made to improve the conditions of the American farmer.

Leaders in the political life and, I believe, the best brains of the country are actively seeking methods by which farm incomes can be increased permanently. While we all have our own ideas as to the best methods by which to accomplish this, nevertheless and regardless of our partisanship, it is fundamental that we in the Independent telephone business in Iowa must actively and forcibly support anything which will tend to stabilize and increase farm incomes.

The outlook in this regard for us in Iowa is not entirely discouraging. In the Des Moines Register of April 9 a report was published stating that the income of the Iowa farmers showed a 36 per cent increase for the first two months of 1939 as compared with the same two months of last year. In fact, for over a period of one year farm income in the state of Iowa has increased over the preceding comparable period.

In the year 1938, the Iowa farm income led the nation, not only in total volume but in the amount of increase over 1937. Generally then, regarding the rural problem, we are at least living in a state that has reason for some optimism.

While the farm problem is our fundamental problem I am thinking more of the problem of our telephone industry in its relation to the farmer. Certainly, with 50 per cent of our telephones in Iowa serving farms, our success or failure depends entirely on our ability to keep our farm telephones in service at a fair and equitable rate. In order to accomplish this, our first duty is to provide adequate and satisfactory service.

At the present time all of us are faced with the necessity of spending considerable money in plant and property to serve farm customers, because of the advent of many more electrical transmission lines and the resulting inductive interference. While many times we have felt this is like throwing good money after bad, yet how can we consider the Iowa Independent telephone industry without realizing that this money *must* be spent if we are to remain in business?

We must have the farm telephone! Even the value of the town telephone is largely made of its ability to contact the farming trade area sur-

rounding our small communities. The trade territory is the life blood of the small community; and a communication system that will not provide means of adequate contact between that trade territory and the community is bound to fail. This is not true of the large cities, of course, but we are not serving the large cities—usually only communities of 2,000 population and less.

Thousands of dollars are being spent for poles, wire, crossarms, insulators, etc., to provide proper talking circuits; yet some of the telephone instruments loaded on the pick-up to be used in making farm installations remind me very much of what it would be like to have a salesman in a clothing store try to sell me a suit of the 1910 vintage.

He could justifiably say that the material in the suit is just as good, if not better, than any that can be obtained today; that it will wear as long; will keep one as warm or as cool as our present clothing. But notwithstanding all of these merits I would not want the 1910 style suit.

While our instruments do not, and should not, change as rapidly in style as does clothing, we all must agree that the telephone on the wall is our real representative in the home—the thing that the family looks at. It represents us day in and day out; yet today there are thousands of farm telephones in service throughout Iowa that in style are of the 1910 or previous vintage.

In Iowa we are largely in the rural telephone business. If we are going to stay in the telephone business we must continue to serve the farmers. Certainly, the first approach to do this is to provide proper, adequate, dependable service, with at least an instrument on the farm-home walls that is not an eye-sore to the entire family.

Admittedly, more progress is being made in this direction than ever before. Sometimes I think this was forced on us by sales resistance during the depression, but we still have a long way to go in the modernization of our equipment and the proper recognition of public requirements from a style standpoint.

We have discussed and heard discussed many times the importance of properly selling our service; the task of making the farmer aware, as we are, of the importance of the telephone in case of fire, sickness, as an instrument of business, etc. We have made progress in this direction. Most telephone companies today have ceased to be "order takers" and are making sincere efforts to point out and emphasize the real value of this service. But even these things are not enough.

If we provide adequate service, continually try to sell the value of our service, our success can be limited without another important requisite—an understanding on the part of the farmer of the problems of our business. I have often said: Anyone can go out and give our service away, but it takes a good man to sell and collect for our service at a price which is proper and fair to the telephone company.

Haven't we reached the point where regardless of the value that the farmer places on telephone service, in order for him to be happy with it and continue it he must be convinced that we are not already getting too much for our service?

Individual understanding of the rural problem, careful and intelligent planning are necessary, says R. A. PHILLIPS, if farm telephone service is to be made profitable.

The history of much of our rural service is familiar. Most of the lines were constructed under a mutual and cooperative arrangement to provide telephone service to the community. There was no particular idea of deriving a profit from the operation of the line; it was merely a matter of furnishing service. When the service life of the property was used up, either another assessment was made for complete rehabilitation of the lines, or the lines were sold to a commercial company and it, in turn, completed the rehabilitation work.

The fact is that we have inherited or otherwise acquired a business that started on a cooperative and mutual basis, designed only to render service not at a profit. And we have been and are now faced with the responsibility of making these lines a commercial enterprise, paying their proper cost for the service rendered, plus a fair profit.

This is our fundamental rural problem; and we must solve it or go out of business, again permitting the lines to become a cooperative enterprise, or seeing them go to stronger hands which perhaps by more than adequate rates in the large centers can continue to support further losses on the rural lines.

Usually we know whether we are making money or losing money at a telephone exchange, but how many of us know what it really costs to render good rural telephone service. If we don't know and are not able to discuss the matter intimately, how can we ever expect the farmer to understand our situation?

After all, we have a great appreciation and sympathy for the farmer's troubles and rightfully so. How was this sympathy aroused? Was it because we recognized the value of good beef, good chickens, good eggs, or corn? No, I think it is largely because the farmer is continually acquainting us with hardships on the farm, and with the real difficulties of operating a farm and making a profit.

It is just as essential that we create this sympathy for our problem on his part, if we are to have his cooperation in keeping farm telephone service. It doesn't matter whether we use 5-cent words or 50-cent words, but he must be told and retold until he recognizes our problem.

While it is hardly safe to generalize, especially with figures, I have tried to reach some conclusion as to the costs of farm service through the use of figures pertaining to a few of our own exchanges of a typical and average size for Iowa. Our average investment in rural telephone plant and equipment in these exchanges is $155 per station.

Certainly, no one would deny the necessity for at least a 4½ per cent depreciation rate if we are to perpetuate our property and keep it rendering good service; and if we are entitled to even a 5½ per cent return on our investment, these two items alone total 10 per cent or $15.50 annually for each farm telephone in the exchanges studied, even if we never answered a call, put a battery in the telephone, or cleared a case of trouble on the lines. This $15.50 per year, in many cases, actually represents more than is being

charged at many telephone exchanges for rural farm telephone service in Iowa.

While operating expenses in the exchanges studied may not be typical for all exchanges, nevertheless it was found that the average maintenance cost per farm telephone amounted to $4.31 per year; traffic expense, on the basis of time spent, $2.85 per station; commercial and general expense, $2.63 per station; and taxes, $1.96 per station.

These items added to the $15.50 indicate that to obtain the costs of rendering farm telephone service and a return of 5½ per cent on the investment requires a rate of $27.25 per year, or an average of $2.26 per month per telephone.

It can be argued, and rightfully so, that the town subscribers have always paid some part of the burden and cost of rendering farm telephone service. This is not denied; in fact, I am aware of a good many sound arguments in support of it. However, with our costs increasing steadily, can we reconcile ourselves to continuing to add a more and more unjust and unfair burden on the town subscribers? I think not.

There is no doubt about it—we must have adjustments in our farm rates; and, in my opinion, we cannot obtain anything like the proper rates until such a time as the farmer has been convinced that we do have a real problem and that we are at the present time serving him at a loss.

Regardless of his appreciation of the value of our service, we cannot sell him if he feels that we are not entitled, from a cost standpoint, to receive a higher rate for his service.

Everyone operating a telephone property can readily go out and count the poles, miles of wire, crossarms and brackets and all of the other equipment necessary to serve your farm customers; and—entirely ignoring that portion of the plant used in the corporate limits in rendering farm telephone service—with your own rule-of-thumb prices and costs for these items, you can come very close to a valuation of the property serving your farm subscribers.

Assuming this property wears out every 25 years, and assuming you feel entitled to a 6 per cent return on the investment you have made in that property, before you do anything in regard to operating it you have a charge of 10 per cent of that investment. This in any case, I believe, will be over $15 per year per farm telephone.

How are we going to make the farmer realize these facts? You might say he is not interested; that he doesn't care what color the barn is painted so long as it's red. But that won't answer our problem. We must find ways to make him understand our problem, just as he has made us understand his.

I appreciate the fact that it is impossible to move from a $1.25 or a $1.50 rural rate immediately up to a $2.00 or $2.25 rate, or whatever is required. As before indicated, it would seem that if farm telephones are to pay their proper burden, the rate should be somewhere near $2.25. Undoubtedly, we will have to take in many bites that which we cannot reach in one bite.

One thing is sure: The difference between the rate that you are now obtaining for farm telephone service and about $2.25 must be made up by a higher rate charged for town service than is justified on a cost basis, if you are to make a profit in the exchange as a whole. This indicates that our farm rates must be moved up as much as possible, even though only a little at a time. In order to do this it will certainly be necessary to tell our story, our troubles and our problems over and over again.

It does very little good for us to tell one another our problems, except that so doing shows our problems, for the most part, are common to the Independent telephone industry in Iowa. Certainly the solution of these common problems should be the common objective of our industry. We can reach that objective, but we will never do it without individual planning upon the part of each of us—planning toward that common objective, the solution of our common problems.

The defeatist attitude has no part in this organization. If any of us in the Iowa Independent telephone industry are convinced that the problem of servicing 50 per cent of our subscribers—the farmers—cannot be solved, then such persons are in the wrong business.

The problem can be solved, but not without individual understanding, careful and intelligent planning toward this our common objective. It may take us a year, two years, three years or more—no doubt it will take some of us longer than others—but we should analyze our situations and start our planning now.

View of a section of a typical rural line.

A modern farmer finds the telephone indispensable.

Weather Forecast Service Proving Popular

Since the opening of the new weather forecast service in New York City, April 8—the first of its kind in the Bell System—calls to the bureau have been averaging more than 35,000 a day. This is enough to assure telephone engineers that despite wars and rumors of wars the public still likes to talk about the weather.

According to a company statement, the greatest number of calls in one day during the first month of the service was 58,000, and on the low day there were 7,500 calls.

Plans have been made already to enlarge the facilities so that twice as many calls can be handled at one time. The present equipment can receive up to about 150 simultaneous calls.

LOCATING AND CLEARING

Rural Telephone Trouble

By Ray Blain

APPLICATION OF A FEW simple rules and principles enable the telephone man to readily locate most line difficulties. Tests made for various troubles. Instrument troubles are more difficult to find. Hints for locating and clearing this class of small exchange telephone trouble

THE ACTUAL clearing of any telephone trouble is ordinarily a quite simple operation after the trouble has once been definitely located. Just as newspaper reporters are reputed to have "a nose for news," so some trouble-shooters likewise seem to be gifted with those rare qualifications necessary for the locating of difficult trouble.

The accurate and rapid locating of trouble, however, can ordinarily be considered difficult and frequently good linemen and installers cannot be classed as good trouble-shooters. Even in the medical profession doctors are not all good diagnosticians, although they may be gifted surgeons.

The ordinary trouble conditions which can occur on any telephone system are not numerous but they are often most difficult to locate when not approached in a systematic manner. In this article an attempt will be made to cite a few simple rules. It is hoped that they may be of some assistance to at least a few of that large army of telephone men whose constant effort is to maintain the systems in such manner as to provide a good grade of telephone service.

As a rule ordinary telephone line trouble may be located and cleared without much difficulty. This type of trouble usually consists of low insulation, short-circuits, open-circuits and grounds. Low insulation is generally due to missing insulators, trees touching the line wires, or defective jumper wire at a cable terminal or buck-arm pole.

Short-circuits and crosses are ordinarily due to missing or loose tie wires, or slack wires swinging together in a high wind. Open-circuits are in most cases caused by line wires breaking down, usually at a tie wire burn. Opens are also frequently caused by a blown fuse in a lightning protector.

Grounds in most cases are caused by dirty discharge blocks in a protector or by line wires coming into contact with guy wires, ground wires or other grounded structures.

Most line troubles can usually be detected by making a careful visual inspection while riding along the line. However, a few special arrangements may be utilized which tend to make the clearing of this class of trouble both easier and quicker.

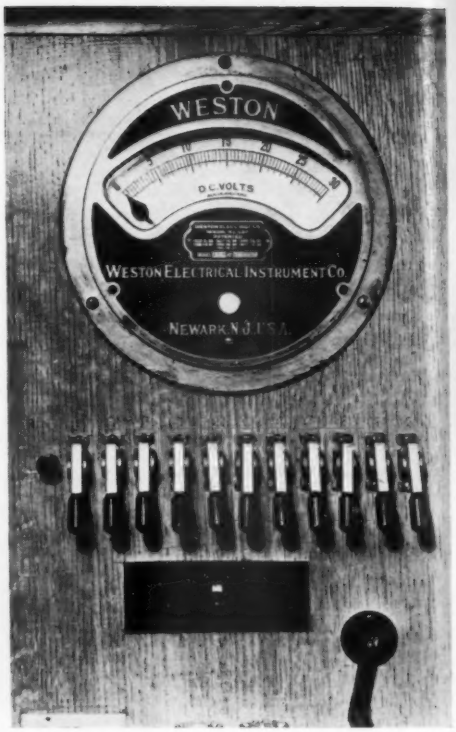
In the old days it was common practice to provide test points in a line to facilitate opening it for test to indicate the direction of the trouble. This arrangement finally developed disfavor due to noise and cut-out trouble which was often traced to test connectors.

Special test sets are available at the present time which may be used to indicate the direction of trouble on a line without opening the circuit. However, when such a test set is not available the test pole method may now be used without fear of trouble. The remarkable improvement in the solderless connector during the past few years now justify a revival of this method.

When solderless connectors are used, test poles should be located at fixed intervals on the line in order to accurately isolate trouble in a certain section of the line. These poles

A test pole in a rural line. Solderless connectors are used to close connections in the line wires after a test has been made.

Close-up view of instrument panel of wire chief's desk showing voltmeter and keys for making various line tests. The keys connect the voltmeter in series with battery across the line or from either side of line to ground.



View of wire chief's test set built in a special cabinet with compartments for records and various small tools.

should preferably be stepped to prevent their injury from frequent climbing with spurs, the wires dead-ended in both directions and the contact made with solderless connectors of an approved type. This arrangement should prove a worthwhile investment to any rural line.

All telephone exchanges, large or small, should be equipped with a suitable wire chief's test set. This set is primarily a good, large scale voltmeter — ordinarily either 10,000 or 100,000 ohms — equipped with keys for connecting it across the line, with battery in series or from either side of the line to ground. The battery may also be disconnected entirely or reversed by the operation of designated keys, for special tests.

This set is most simple to use and may be utilized to advantage in the making of insulation or resistance measurements on a line. These sets in various forms are now on the market and may be procured at a reasonable cost.

When a wire chief's test set is available, the method of providing a condenser in series with the ringer bridge at each telephone on a line is favored. This proves of lasting benefit in maintaining good service, as a normal line will test clear and indicate a capacity kick on operating the reverse key of the test set.

Leakage, short-circuits or grounds will likewise be indicated by a permanent deflection of the voltmeter. When this method is used, it is a simple matter to check all lines each morning and often detect trouble and correct it before it causes a complete failure on the line.

Intermittent trouble is always the most difficult to locate on any line. Trouble of this nature has been caused by a wire swinging into a ground when the wind blows only in a certain direction. To permanently clear intermittent trouble generally requires a careful covering of the entire line and correcting all doubtful conditions which could possibly cause trouble.

Noise and cut-out troubles which come and go are often caused by inferior line-wire splices or sleeve conductors not properly installed. Frequently this condition may be detected by placing a short-circuit on the line and then watching the swing of the voltmeter needle. When using this method a line has been observed to swing completely open, due to one or more defective splices.

Special instruments may be used to test and to detect noisy splices although this method is slow and rather expensive. When noise and cut-out trouble due to defective splices, has been detected it is recommended that the entire line be covered and all doubtful splices removed. This can be done with comparatively little effort, and it will not prove overly expensive, by making use of the new compression type splicing sleeves.

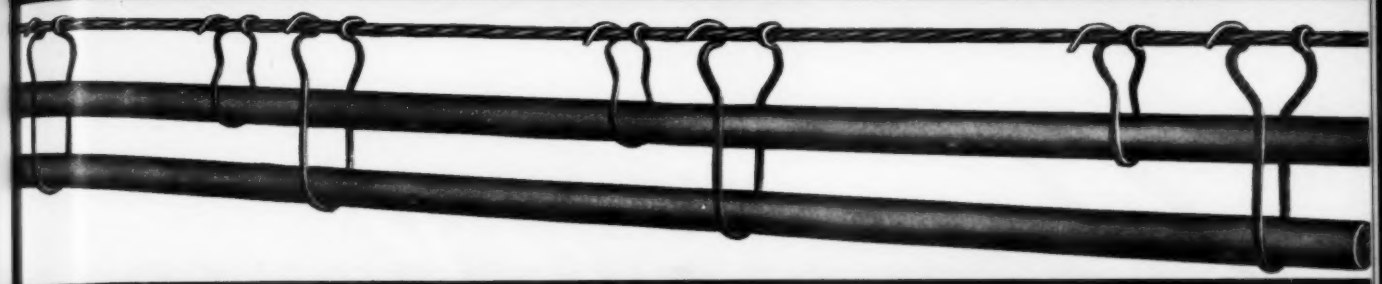
The ground connection performs a very important function on either a metallic or a grounded line. There are numerous methods of testing ground connections. Most of them require special testing equipment and limited space will not permit their description. However, a good ground rod five to eight feet in length will make a good connection in almost any type of soil and seldom cause trouble.

Ground connection trouble is generally due to a poor contact between the ground wire and the rod, and not between rod and ground. It is recommended that first a good ground rod be obtained and then make sure that a good electrical contact is made with it. Then you may be certain that you will not have any trouble from this source. It has also been proved that a rusty rod makes a good ground connection if the wire is placed in positive electrical contact with it.

Trouble in subscribers' telephones will ordinarily be the most difficult for the average repairman to locate. However, it may be said that the modern magneto telephone causes very little trouble as compared to the older models of only a few short years ago. Instrument troubles will

(Continued on page 32)

Hang the Cable—Quickly—Easily—Securely with



"The Ring with the Tension Grip"

You simplify and speed up the cable hanging when you use National Rings—regular and extra long.

National rings are quickly and easily placed on the strand—once on they will not slip out of position or jump off. Their use eliminates reriding the strand to replace or respace rings and permits pulling the cable in either direction.

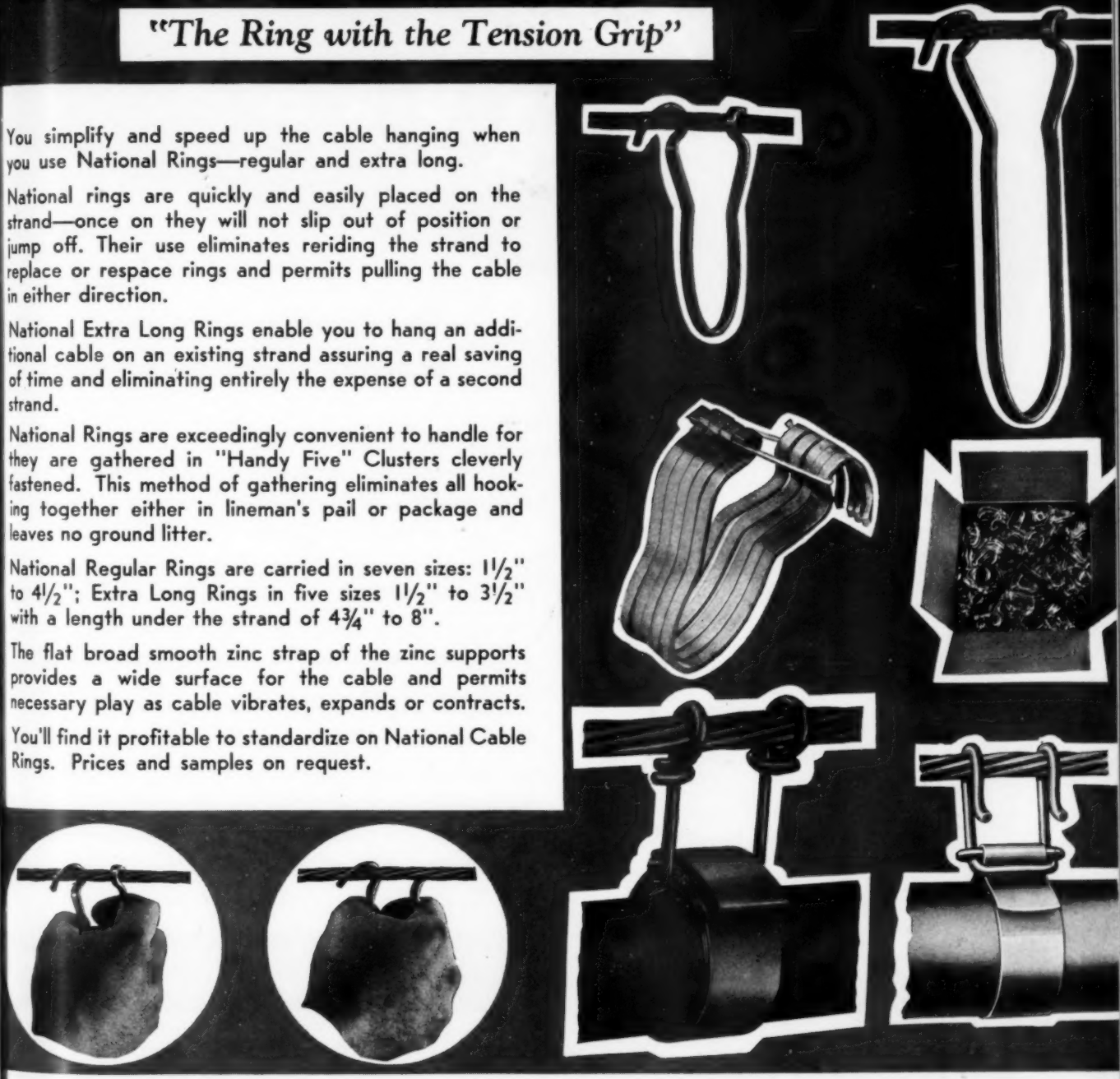
National Extra Long Rings enable you to hang an additional cable on an existing strand assuring a real saving of time and eliminating entirely the expense of a second strand.

National Rings are exceedingly convenient to handle for they are gathered in "Handy Five" Clusters cleverly fastened. This method of gathering eliminates all hooking together either in lineman's pail or package and leaves no ground litter.

National Regular Rings are carried in seven sizes: 1½" to 4½"; Extra Long Rings in five sizes 1½" to 3½" with a length under the strand of 4¾" to 8".

The flat broad smooth zinc strap of the zinc supports provides a wide surface for the cable and permits necessary play as cable vibrates, expands or contracts.

You'll find it profitable to standardize on National Cable Rings. Prices and samples on request.



AMERICAN AUTOMATIC ELECTRIC SALES COMPANY

1033 WEST VAN BUREN STREET, CHICAGO

Warehouses at Chicago • Kansas City • San Francisco • Richmond

Step Up Monthly Revenue WITH THE 32-A P-A-B-X !

This Simple, Low Cost Syst[em] Is Ideal for Business Users Who Need Unl[imited]

The Automatic Electric 32-A P-A-B-X provides a practical [and] effective way for telephone companies to increase reve[nue]. It permits them to offer modern, automatic private excha[nge] service to a vast new group of live prospects—those sm[all] business organizations that need private exchange ser[vice] but cannot justify the cost of regular P.B.X. attendance. [It] also appeals to present P.B.X. users because it provides th[em] with an improved type of service at a lower operating c[ost].

The 32-A P-A-B-X provides these modern features: lightn[ing] fast automatic interior connections—improved city excha[nge] service (calls can be picked up, placed or transferred at [the] local station)—complete service twenty-four hours a [day]. Service like this is particularly economical and effective [for] small business and professional offices, stores, residences, [etc].

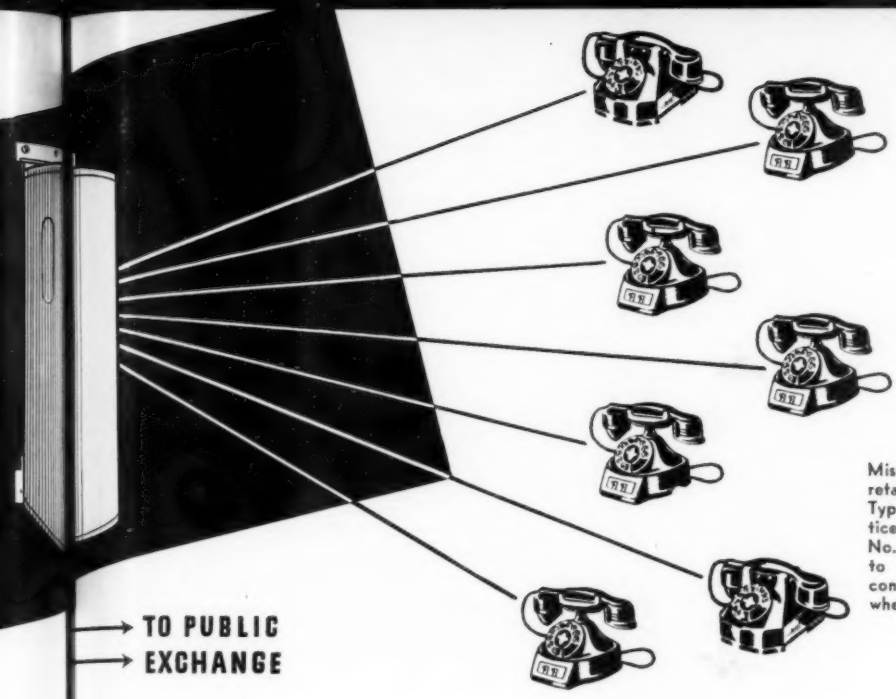
Send For This Free Literature

To help you sell P-A-B-X service, we have prepared this series of attractive folders for distribution to your best prospects. We shall be happy to supply you with any reasonable quantity without charge. Write for samples!

AUTOMATIC

MAKERS OF TELEPHONE, SIGNAL AND ELECTRICAL ENGINEERS

Distributors Possible
AMERICAN AUTOMATIC ELECTRIC SALES CO., NEW YORK, N.Y.
Export Distributors: AUTOMATIC SALES CORP.



Syst peals to the Vast Market of d Une ed Branch Exchange Service.

ractical ere it is impractical to employ switchboard attendants.
se reven
e excha
ose sma
nge ser
endance.
ovides th
rating c

: lightn
y excha
rred at
urs a
ffective

lences, e

For larger organizations, we offer a wide range of other A-B-X systems for use on an attended or unattended basis desired, and including various organization control services, ch as Code Call, Conference, Executive Key Calling, Right- Way, Watchmen's Checking—in any combination to meet ividual needs.

re is truly modern private exchange service which literally s itself wherever it is introduced. Why not give it a chance your territory? Our field representative will be glad to rk with you on specific applications. Ask him about A-B-X service next time he calls, or write us for full rmation.

TIC ELECTRIC

SIGNA D COMMUNICATION APPARATUS
INEERS ERS AND CONSULTANTS

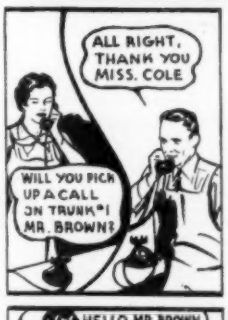
istributor Possessions:
RIC SAL NY, 1033 W. Van Buren St., Chicago, U. S. A.
AUTOMA C SALES COMPANY, LIMITED

TRANSFERRING A TRUNK CALL FROM ONE TELEPHONE TO ANOTHER WITH THE TYPE 32-A P-A-B-X

Miss Cole, a clerk in a retail store served by a Type 32-A P-A-B-X, notices that Lamp Signal No. 1 is on and goes to the nearest trunk-connected telephone where she—

—presses down on lever-key No. 1 and lifts the hand unit. This connects her to the calling party and extinguishes the lamp. Finding that the caller wants the manager, she—

—restores the lever-key and dials Mr. Brown's number. Mr. Brown, the manager, hearing his signal—



—answers by lifting his handpiece which stops the signal. He is given the message that a trunk call is waiting for him on Trunk Line No. 1, so—

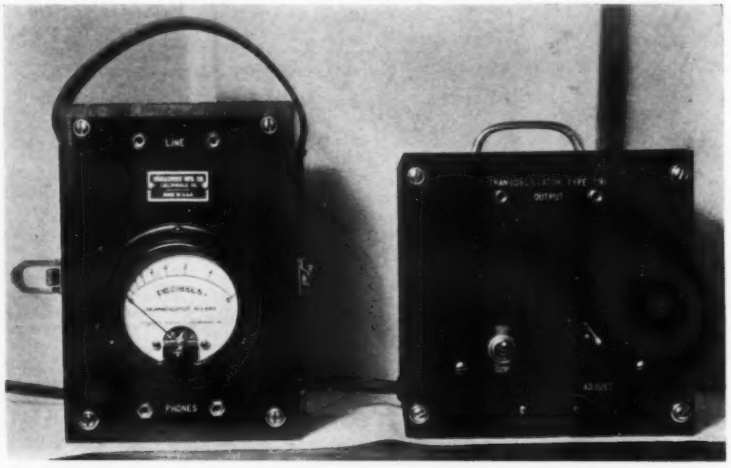
he operates lever-key No. 1 and answers the call.

(Continued from page 28)

ordinarily consist of run-down batteries, hook switch, hand generator and ringer defects.

Occasionally an induction coil, condenser, transmitter, or receiver will become defective; but this never happens with any great frequency in these modern times. Instrument trouble will ordinarily be considerably reduced by equipping all telephones with adequate lightning protectors and making certain they are well grounded.

When a magneto telephone is reported in trouble, one of the first things to be considered are the batteries. The telephone set should be tested with an approved instrument if available; if not, a well-trained troubleman can usually test the transmitter, receiver and batteries by blowing into the transmitter or scratching gently on the mouthpiece. When making this test best results can usually be obtained by disconnecting the instrument from the line and short-circuiting the line terminals.



An inexpensive transmission test set for measuring the transmission of any part or of the complete rural line. It may also be used in testing complete telephones. The decibel meter is shown on the right and tone generator on the left.

While this test can be used with fair success, the writer prefers to connect a milliammeter in series with the battery and then watch the fluctuations of its needle as he talks into the transmitter. With this method a troubleman will soon learn just how a good battery and transmitter should respond in order to give a good grade of service. If there is any doubt that the battery is defective, it should be replaced.

Trouble in the hook switch is generally due to faulty adjustment of the spring contacts. This trouble may often be detected by applying extra pressure on the contacts with the switch in an operated position. The contacts should be cleaned with an approved type of contact burnisher or a strip of hardwood.

Carbon tetrachloride is very good to use to clean contacts but it leaves an insulating film on their surface which must be removed by burnishing. A file should never be used on contacts as it will soon ruin the special metal inserts. The contacts should all be well centered and the springs adjusted to make a positive electrical contact.

Receivers themselves cause very little trouble although subscribers frequently ruin the diaphragms by bending them. Fortunately though, diaphragms cost very little, and they should be replaced when bent or when the enameled surface is damaged.

The strength of receiver magnets is often tested by requiring them to hold the diaphragm on edge. When they will do this, they are supposed to have adequate magnetism. If this test is used, care should be taken to not damage the lacquer finish of the pole pieces so as to permit them to rust.

The cord terminals should be checked, cleaned and tightened. The receiver cord can be moved to detect noise and cut-out trouble; replacement is the only remedy for a defective cord.

Due to improvements in the magnetic qualities of steel, the present-day hand generator may be somewhat smaller than formerly although the principle of operation remains approximately the same. Trouble is frequently caused on the old type hand generator by using too much oil on the bearings.

Oil your generators if you must, but use only a drop or two of good oil in the hole provided to carry it down to the bearings. The bearings are large and well-fitted and should require very little oil or attention on the average telephone. The shunt-spring contacts of a generator should be cleaned, aligned and adjusted.

Ordinarily the ringer movement in a magneto telephone will cause very little trouble if left alone, for it is properly adjusted and gauged when it leaves the factory. When a bell refuses to ring properly, examine the armature first to make sure that it does not bind.

If this is so, free it and then adjust the gongs so that the clapper just barely clears them when the armature is moved by hand. When the armature is energized the clapper will then strike the gongs with just the proper force to give a good clear ring. Ordinarily this is about the only adjustment a ringer movement will require.

On some long and heavily-loaded rural lines difficulty may be experienced in ringing due to a number of receivers being off the hook, which places a low impedance bridge across the high impedance ringers. A simple remedy for this condition is to place a condenser of about ½ mf. capacity in series with the receiver and secondary winding of the induction coil of each telephone. This small-capacity condenser provides a high-impedance to the low-frequency ringing current and a small impedance to the high-frequency voice currents.

Considerable low transmission trouble on rural lines may be traced to subscribers who do not talk a proper distance from and into the transmitter. This condition may be improved to some extent by an educational campaign although there will always be some who will turn their cheek to a transmitter and then wonder why the party at the other end of the line has difficulty hearing them.

The handset type telephone appears to be the only sure remedy for people of this type, for it forces them to talk into the transmitter in such a manner as is approximately correct for best results. Handset type magneto telephones of various types are now available and undoubtedly they are the ideal type of instrument for all rural line use.

Transmission testing equipment is on the market at a reasonable cost.

Crapo

HIGH-TENSILE

LOW-RESISTANCE

TELEPHONE WIRE

For Long Spans

For Extra Long Spans

TELEPHONE companies today are building stronger, more efficient rural lines at just about one-half the former cost.

Longer-span, lower-cost construction has been made possible by the development of *Crapo* HTL-85 and *Crapo* HTL-135, the new, high-tensile, low-resistance galvanized line wires.

Crapo HTL-85 permits the use of spans of 225 feet in heavy loading districts up to 375 feet in light loading districts; provides stronger spans, at no increase in cost, on existing lines.

Crapo HTL-135 makes practicable extra long spans of 350 feet in heavy loading districts to 500 feet in light loading districts.

Both Crapo HTL-85 and Crapo HTL-135 possess telephone transmission qualities superior to the B.B. grade.

This important fact, combined with the high strength of these wires, insures more satisfactory service to subscribers, with lower maintenance costs, more profitable operation, for the exchange.

Complete technical data and construction practice information about *Crapo* HTL-85 and *Crapo* HTL-135 are available in booklet form. Write for Bulletins No. 201 and No. 202.

INDIANA STEEL & WIRE COMPANY · MUNCIE, INDIANA

Best Story of the Week—What's Yours?

Some years ago, while wire chief in the then Independent common battery exchange at Mangum, Okla., Lee C. Sprague, helped neighboring Independents in their trouble work.

One day the elderly owner of the grounded line exchange at Jester asked him to investigate a puzzling case of trouble. His subscriber's complaint was that every time the telephone rang, the dog howled. Arriving at the subscriber's home, Mr. Sprague found the story was correct: Every time the telephone rang, the dog howled.

Then the cause was found. The ground wire of No. 9 fence wire ran down the side of the house and was twisted rather loosely around a rusty drag tooth. The drag tooth was stuck in the rather sandy soil; not much of a ground.

A light chain from the dog's collar was snapped on the ground wire. It was attached to a metal ring fastened to the dog's collar by means of a brass plate having four brass rivets through the leather to the inside of the collar, and some of the rivets evidently made good contact against his neck.

"The weather was hot," writes Mr. Sprague, "and the purp had crawled under the porch where it was cool and also damp. When some of the country cousins swung onto those six-bar Swedish-American generators, they put out plenty of juice on the grounded telephone line.

"It came along the line, through the telephone bells and down the ground wire. But the ground on the drag tooth in the sand was bad, so the ringing current went along the dog's chain, through the brass rivets of the collar to the dog's neck — and then through the dog to the damp ground.

"Personally, I don't blame the dog for howling; I howled when I found the trouble."

"This is a true story" concludes Mr. Sprague who is now district superintendent of the Southeast Arkansas Telephone & Power Co. at Star City, Ark. "The plant at Mangum has long since been sold to the Southwestern Bell company, and I imagine that the plant at Jester was scrapped years ago. Now you tell one!"

It will, the writer believes, if properly used, prove of great benefit in the maintenance of all rural lines. This set consists of a 1000-cycle tone generator and a meter calibrated in decibels. The meter is direct reading and may be used by anyone to measure the transmission of any part, or the complete rural line.

The oscillator used to generate the 1000-cycle tone operates from 110-volts alternating or direct current and employs vacuum tubes of the ordinary radio receiving type. This tone generator is housed in a black-finished metal case with a handle for carrying. It comes complete with tubes and a six-foot length of heavy duty cord for connecting to the supply voltage. The output terminals are metal binding posts although space is provided for the mounting of switchboard jacks if desired.

The decibel meter consists of a sensitive rectifier type instrument, calibrated from 10 decibels through zero to six decibels. The instrument is mounted on a high grade bakelite panel and is provided with metal binding posts for connecting to the line. Additional binding posts are provided for monitoring by means of a receiver. The panel is mounted in a sturdy case, which makes the set portable and suitable for use out on the line.

The tone generator may be placed near the switchboard so that it can be connected to the line by an operator. The troubleman out on the line can carry the decibel meter and connect the instrument at convenient points for test. The line may be tested at certain intervals and a record kept. Then any test which shows an increase in the transmission loss will be an indication that trouble has developed which should be corrected.

This transmission set can also be used to advantage in the testing of complete telephones or in comparing one part—such as transmitters or receivers—against the other. Tests of this type will indicate numerous troubles which may be accurately cleared and which would probably never be detected by any other method.

The tone generator may also be used to advantage in selecting and identifying cable pairs or for detecting cut-out trouble. To accomplish the latter the tone may be placed on a line while the troubleman listens to it through a telephone. The cord and other parts of the instrument can be moved, and any cut-out will register as an interruption of the steady tone. It is probable that anyone who makes use of a test set of this type will never be contented to go along without it.

Minor rural line instrument repairs can be made on the subscriber's premises but any extensive repairs to a telephone should be made in the shop where soldering irons and other necessary tools are available.

When the telephones are company-owned it is desirable for the troubleman to carry at least one and preferably two instruments with him on all trouble trips. Then when a tricky instrument is found and he is not sure that he has located and permanently cleared the trouble, he can change the telephone and later give the defective one a complete overhaul and refinish in the shop.

This method will always make a favorable impression on the subscribers and will usually prove an economy as repeat trips on the same case of trouble are avoided.

These suggestions do not cover the entire field of trouble locating on rural lines, nor is it claimed that the system suggested will prove complete in all cases. It is felt, however, that all good troublemen will outline some scheme of approach for all trouble and the one mentioned here is only a suggestion.

It is hoped that some scheme will be used and then parts taken away from it or added to it until a system is found which satisfactorily meets the needs. If this is done it will undoubtedly be found that it permits the clearing of trouble cheaper for the company and makes it much easier for the hard-working trouble-shooters.

▼ ▼

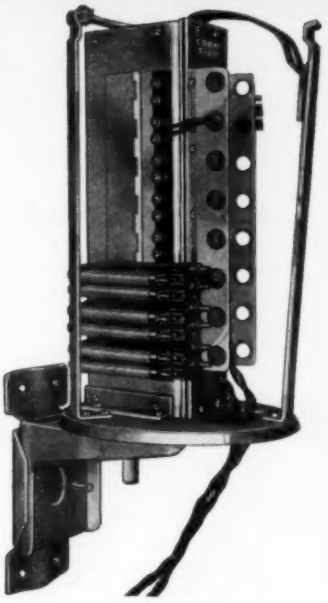
Appeal Illinois Refund to U. S. Supreme Court

The United States Supreme Court May 15 was asked to review a decision of the U. S. Circuit Court of Appeals in Chicago on February 22 which held that the Illinois Bell Telephone Co. was entitled to retain $1,688,295 remaining unclaimed from a fund of $18,897,980 ordered refunded to subscribers who paid overcharges.

The appeal was taken by the state of Illinois and the Illinois Commerce Commission through Attorney General John E. Cassidy.

Assistant Attorney General Harry R. Booth declared in his petition that if the company were permitted to retain this residue, "public utilities would be encouraged to charge excess rates" on the theory that they would retain at least part of a possible refund.

Equip Your Terminal with Just the Amount of Protection *Needed* and Save Accordingly

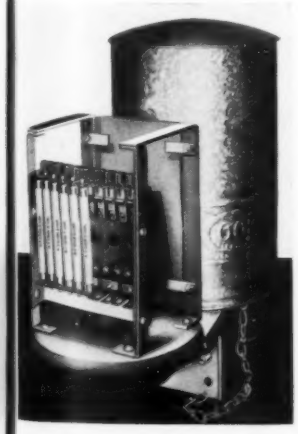


with the New COOK S·20 PROTECTED CABLE TERMINAL

The S-20 is completely new in design, providing, for the first time, all the features you have wanted in a cable terminal. Write today for detailed information about its fourteen points of superiority.

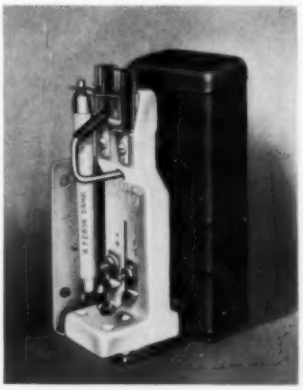
PROTECTED OUTDOOR COIL MOUNTING

Light. Compact. Weatherproof. Fireproof. A convenient single or double protected mounting for all types of repeating coils. All terminals are readily accessible. Equipped with A-7 fuses and True Gap Dischargers.



TYPE "O" SUB-STATION PROTECTOR

Every subscriber's station should be protected against the danger of lightning and hazards from light and power circuits. Type "O" is weatherproof and when mounted outdoors keeps high potentials outside the house.



★ COOK ★

COOK ELECTRIC CO., 2700 SOUTHPORT AVE., CHICAGO

FORTY-FIFTH BIRTHDAY celebrated, with presentation of new telephone developments at annual conference of

Stromberg-Carlson's Sales Representatives

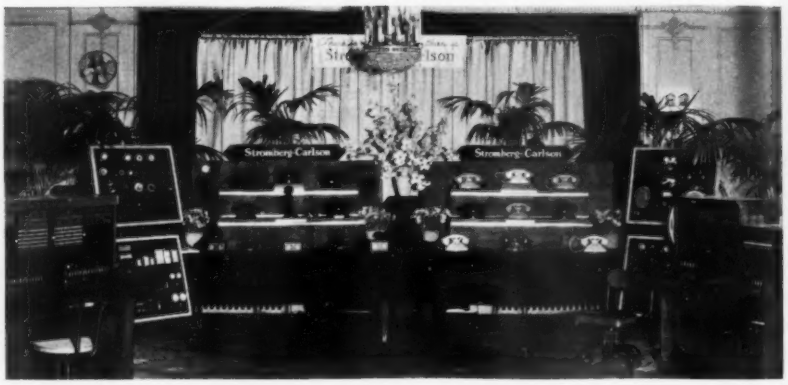
TELEPHONE sales representatives of the Stromberg-Carlson Telephone Mfg. Co. from all over the United States and Canada gathered May 12 at the Hotel Sagamore, Rochester, N. Y., for the company's annual sales conference.

E. A. Reinke, commercial sales manager and chairman of the meeting, declared it was the most enthusiastic Stromberg-Carlson sales meeting in the past ten years. He reported a steady growth in the volume of business and predicted an even larger growth for this year, the company's 45th, due to outstanding engineering advances and gearing of the factory to increased production.

Delegates were welcomed by Stromberg-Carlson's president, Wesley M. Angle, and then Sales Manager Lloyd L. Spencer inspired the gathering with his enthusiasm for the work Stromberg-Carlson is doing for the Independent telephone industry.

George A. Scoville, vice-president and general manager, presented a summary of developments in the telephone field and outlined the policies of Stromberg-Carlson. He discussed merchandising activities and presided over an open discussion of sales problems.

Declaring that application of Stromberg-Carlson's radio experience to telephone design had produced an unparalleled instrument, Dr. Ray H. Manson, vice-president and chief engineer, pointed out the accomplishments of the Stromberg-Carlson acoustic laboratory's work along these lines.



Part of the Stromberg-Carlson display of telephones and switchboards in one of the conference rooms at the firm's annual sales meeting.

"Prior to the development of the radio," Dr. Manson said, "the primary requirement of a telephone system was that the sound transmitted from one point to another have adequate strength and intelligibility, but should not be, necessarily, of high enough quality so necessary for realness—easy recognition of a speaker's voice.

"On the other hand, in a radio system, the broadcast transmitter, with its associated transformers and other sending apparatus, is very highly developed, projecting on the ether a band of frequencies broad enough to transmit the full, beautiful tones of a symphony orchestra and the fundamentals and overtones of the speaking voice so necessary for full reality—easy recognition of a speaker's voice.

"Not only have the efficiency of parts been improved, but they have been reduced in size, making it possible to produce a one-piece, compact, self-contained handset telephone in an entirely new design."

Stromberg-Carlson sales representatives and officials' banquet at Hotel Sagamore, Rochester, N. Y., during the company's recent annual sales conference on the 45th anniversary of the Stromberg-Carlson Telephone Mfg. Co.

LENZ
LENZ RECEIVER CORDS
have tough outer braid with the finest moisture proofing assuring long life and trouble-free service.
Economize During 1939 with Lenz
DISTRIBUTOR
H. H. VAN LUVEN
307 E. 3rd St., Los Angeles
DISTRIBUTOR
Leich Sales Corporation
222 W. Adams St., Chicago

LENZ ELECTRIC MANUFACTURING COMPANY
1751 N. WESTERN AVE., CHICAGO, ILLINOIS, U. S. A.
"IN BUSINESS SINCE 1904"

Help your Operator...

with the new Model 33
CALCULAGRAPH

Help your operator get more accurate results on toll calls.

COMPACT — 7½" x 3⅜". Takes up minimum space on switchboard.

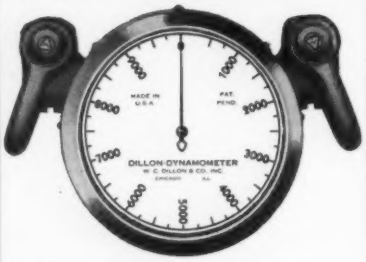
UNOBSTRUCTED VIEW—Full vision of dial from any position on the switchboard.

SWEEP SECOND HAND—Tells the end of the initial period at a glance.

There are other new features you will appreciate.
Write for information.

THE CALCULAGRAPH COMPANY
310 Sussex St. Harrison, N. J.

New Dillon Dynamometer



- Since the stringing of the first telegraph wire, construction engineers have wanted an instrument for registering the pound pull being put on wires and messengers when being installed and throughout maintenance. An instrument to eliminate judging tension by sag, one within purchasable price range. Such an instrument is now available—The

Dillon Dynamometer

- The Dynamometer is used in series with a block and tackle to register the pound pull being applied to a cable, guy or messenger. For getting the strain even where more than one guy wire is used to hold a pole, or where two or more cable messengers are parallel; for measuring strain of lines crossing railroads, to be sure of having the right factor of safety, etc.
- Over-stressing of cables, guys and messenger causes structural injury which often causes a corner pole or lead of poles to go down that would otherwise have weathered a storm. The use of a Dynamometer protects against such condition.
- The Dillon Dynamometer has Accuracy, Adaptability, Strength, Portability, Light weight. It is designed to give continuous service over a prolonged period of years without deterioration. The instrument cannot be injured by 100% overload, or from a recoil due to breakage of equipment or messenger.
- During earlier years of pole line construction work Dynamometers were not available and tension had to be judged by sag. Of late years Dynamometers have been available at $250.00 and up, for 10,000 pound capacity, but at this price they have not been used to any extent regardless of Engineers' desire to specify their use in construction and maintenance work. It is our pleasure to establish a price of $97.50 for a 10,000 pound capacity Dynamometer, placing it as well as our other capacities within a price range of all companies.
- The use of a DILLON DYNAMOMETER is "Insurance" against break-downs. Its use will add security to outside plant. Write for trial test—stating capacity—at our expense.

Price F. O. B. Chicago

5,000	pound capacity	$84.50
7,500	pound capacity	91.00
10,000	pound capacity	97.50
15,000	pound capacity	117.50

Specifications

Metal, High Duty Alloyed Steel
Tested to 100% overload
Dimensions, 7½"x5¾"x2⅜"
Weight 6 pounds

★

Manufactured by

W.C. Dillon & Co., Inc.

216 No. Clinton Street
Chicago, Illinois

C. E. Heston, assistant telephone sales manager, gave a presentation of the 1210 and 1212 handsets which embody the improvements developed by Stromberg-Carlson. Mr. Heston said the first step in the development of the new high efficiency Stromberg-Carlson handsets came six years ago with the introduction of a new transmitter.

"It resulted from applying to the field of telephony the knowledge gained through the studies of voice transmission in the radio field," he said. "The transmitter employs the conical-shaped diaphragm of the radio speaker, which causes its center to move as a rigid unit with a piston motion. Annular corrugations near the outer edge give a maximum flexibility so that greater movement is gained with the same effort.

"A feature of the receiver is that firm clamping of the diaphragm without excessive tension is insured at all times because the ear cap's thread is entirely independent of the receiver's mounting thread. Consequently the receiver gives a quality of reception comparable to the transmission qualities of the improved, highly-efficient Stromberg-Carlson transmitter."

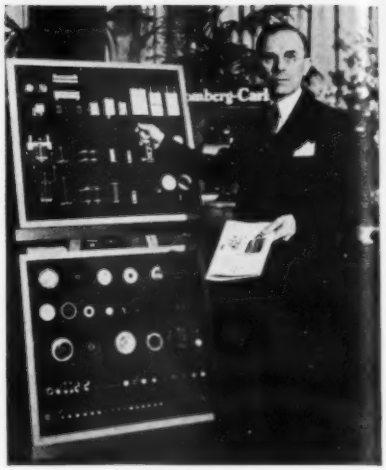
"The arrangement of parts within the base of the instrument necessitated the development of compact parts of high efficiency. Here is where Stromberg-Carlson's radio experience played an important role," Mr. Heston continued. "An induction coil and capacitor, each highly efficient, but only one-third the size of those previously used, were developed.

"Stromberg-Carlson engineers were also rewarded with a two-gong, two-toned ringer which, though compact, met all requirements. Thus the 1210 and 1212 self-contained handsets were made possible with a base only slightly larger than those previously used."

Chairman Reinke, before entering a discussion on Stromberg-Carlson switchboards, stated that the firm's switchboard business had shown continued growth each year since 1933.

Supplementing Mr. Reinke's remarks, Stuart Beecher of the telephone sales department outlined the many and varied uses for the firm's 2-6 and 2-10 telephone systems. He pointed to dozens of installations made in the past few years in estates, theatres, schools, hospitals, garages, clubs, and varied small business organizations.

He described the 2-6 and 2-10 systems as simplified common talking, selective ringing telephone systems with two trunks and 6 or 10 lines, as the case may be, providing local intercommunication and central office service from the same telephone without the services of an attendant operator.



DR. RAY H. MANSON, Stromberg-Carlson vice-president and chief engineer, points to the new Stromberg-Carlson capacitor as he explains to delegates how the company's radio experience lead the way to more efficient, more compact telephone parts.

Further talks on switchboards were given by R. H. Barger, sales engineer; W. J. Pfaender, Illinois representative, and W. C. Caldwell, Minnesota and Dakotas representative.

The final part of the of the program before general discussions took place, was given over to a talk on supplies and materials by Stromberg-Carlson's vice-president in charge of production, E. A. Hanover.

During the convention, one minute's silence was observed as a tribute to the late Ben Woodbury.

▼ ▼

Association Closely Following Wage-Hour Amendment

The Norton omnibus bill intended to amend the national Wage-Hour Act, introduced in the House of Representatives, has encountered heavy going there. This bill following its introduction March 29 by Mrs. Mary T. Norton, chairman of the House labor committee, was referred to that committee. It was held up in the committee for several weeks because those parts of it creating exemptions for certain agricultural workers were not satisfactory to the agricultural people.

The Norton bill carries an exemption for operators of telephone exchanges of 500 stations or less. The bill, when originally introduced, exempted only up to 350 stations but the committee itself raised the number to 500.

It was the intention of the House labor committee to include in this bill all the exemptions that were to be made at this session of Congress to the Wage-Hour Act. The committee expected to

obtain a rule from the House rules committee under which the bill when reported out by the committee would receive preferential treatment on the House calendar and would not be subject to any amendments on the floor.

The objections of the agricultural people, however, prevented that; and the bill could not be brought out under suspension of the rules which requires a two-thirds vote, and that vote apparently could not be obtained.

The row over the agricultural sections of the bill became so aggravated that Mrs. Norton has introduced another bill in the House, providing for all the exemptions named in the original excepting the agricultural sections which were controversial. It seems doubtful, however, if this substitute bill can get through the House because of the opposition it will meet from the agricultural people.

Senator John E. Miller, of Arkansas, introduced in the Senate a few days ago an omnibus bill to amend the Wage-Hour Act which, it is understood, contains exemptions satisfactory to the agricultural organizations. It also proposes to exempt operators of telephone exchanges having up to 800 stations. It was expected that an identical bill would be introduced in the House of Representatives by an interested Congressman.

The present status of the telephone amendment is that it is tied up in these bills, with controversial issues having nothing to do with telephones.

It is very likely that a bill for the purpose of exempting telephone exchanges only would go through both House and Senate without difficulty, particularly if the exemption were for not more than 500 stations. There seems to be considerable chance also that an exemption for a larger number of stations would be granted if this question could be considered by the Congress separately from the controversial issues in the omnibus bill.

At present there are several bills referring to telephones only which were introduced some time ago, including that introduced by Senator Clyde L. Herring, of Iowa, and the identical bill introduced by Representative Vincent F. Harrington, of the same state, both of which provide for an exemption of exchanges of up to 1,000 subscribers.

At the time this is written the situation is quite confusing and it is impossible to determine just what the next move will be by the special wage and hour committee of the United States Independent Telephone Association. Secretary-Treasurer C. C. Deering of the association, has been in Washington for the past ten days, and

"—the lowest operating costs we have ever recorded"

J. I. Kennedy
Northwestern Telephone Co.

You, too,
Can Save Money on Batteries

● Testimonial after testimonial comes in to us—all saying much the same: "We SAVE MONEY by using Burgess Batteries."

—But it is really not surprising. The Burgess Laboratories have spent years investigating the requirements of your telephone battery service. The discovery of CHROME—the battery "life saver"—is an example of the success of their work. The development of the new size and shape of the Twin-Six is another.

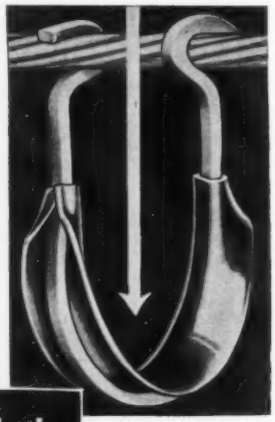
Why not "discover" all the Twin-Six advantages for yourself?—Discover how you, too, can save money—simplify your battery problems. Order a supply of Burgess 4F2J Twin-Sixes today—and give them a trial. Price—only 49c for 3-volt units in lots of 30 (57c in Pacific territory). Freight paid to your telephone exchanges.

BURGESS BATTERY COMPANY
Freeport, Ill.

BURGESS
TELEPHONE BATTERIES

STOP COSTLY
RING CUTTING

INSTALL—
KEARNEY
CABLE RING
SADDLES



Made in 6 SIZES

TAKE NO CHANCES on interrupting a customer's service — prevent damage to lead cable and costly repairs by installing Kearney Cable Ring Saddles which effectively and inexpensively eliminate ring cutting. . . . These saddles, made of soft aluminum sheeting, are preformed to afford a smooth bearing surface for the cable. . . . An inexpensive item that pays for itself by keeping your cables in good condition.

Ask About FREE Sample

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

DISTRIBUTED THROUGH JOBBERS

TELEPHONE ACCESSORIES

John H. Agee, chairman of the special committee, went there last week. It is likely that a meeting of the full committee will be held in Washington within the next few days—or at least as soon as the situation is somewhat clarified—for the purpose of determining and initiating the association's next move.

It is generally recognized that the wage and hour committee of the association has submitted for the Independent telephone industry a case so strong that it cannot be ignored. The principal difficulty with the telephone exemption now is that, as has been previously said, it is tied up, through no fault of the association's committee, with other interests which are controversial.

▼ ▼

Telephone Envelope Slogans Popular with Collectors

Slogans printed on small-size envelopes, sent out with telephone bills, are becoming very popular with collectors, according to W. M. Swan, Jr., in the American Stamp Journal.

"The telephone slogans have variety," says Mr. Swan, "that is pleasing to the collector who also is aided by the fact that they come on small covers. There are a few collectors who are making up a specialized collection of the telephone meter slogans."

With the Manufacturers

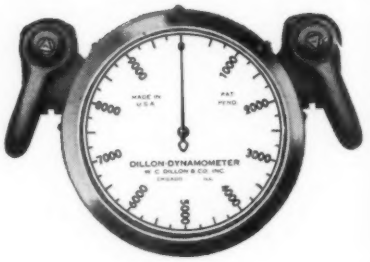
A Traction Dynamometer for Determining Wire Tension

A traction dynamometer, an instrument to eliminate the judging of tension in wires by their sag, has been developed by W. C. Dillon, president, W. C. Dillon & Co., Inc., 216 N. Clinton St., Chicago.

One type has just been developed for use on long span construction work which is lighter and more compact than the standard instrument.

The use of a dynamometer in series with a block and tackle when guys and messengers are being installed, prevents over-stressing and thus avoids structural injury to the wire that may result in an expensive break-down. The working life of a wire or messenger is prolonged by installing it at an accurate tension.

Mr. Dillon states any ordinary workman, without the slightest engineering knowledge, can quickly place guys or messenger on new or old installations at the proper tension, with the use of this instrument. A bulletin describing the instrument more fully is available to those interested.



The new Dillon dynamometer for measuring tension in line wires, messenger strand and guys.

▼ ▼

Two Personnel Changes in A. B. Chance Co.

Recent personnel changes have been made in its sales organization by the A. B. Chance Co., Centralia, Mo. Jack Curtright, who traveled a short time in the central states, has been transferred to a western territory where he will cover most of Washington, Oregon, Idaho, western Montana, Utah, Arizona, Nevada and California. He will represent the Chance company in the sale of anchors, guy fixtures and tips tools.

Jack Rice has recently been appointed to the New York office in charge of the eastern branch of the sales organization. Although Mr. Rice is a native New Yorker, he was transferred from the California office where he had been located for several months.

Mr. Curtright went to Chance company from a division of the General Motors Corp., but previous to the latter connection had been with the Chance company in the capacity of assistant sales manager.

▼ ▼

Automatic Installation in Colombo, Ceylon

One of the largest installations of automatic equipment ever made in the tropics has, it is believed, settled a 59-year-old telephone problem for Colombo, capital and principal city of the island of Ceylon, British Crown colony south of India. Details of the telephone project have been announced in this country by the International Telephone & Telegraph Corp. whose associated

JACK CURTRIGHT represents the A. B. Chance Co. in the sale of anchors, guy fixtures and tips tools in Washington, Oregon, Idaho, western Montana, Utah, Arizona, Nevada and California.

company in England, Standard Telephones & Cables, Ltd., manufactured and installed the equipment for the Postal Administration in Ceylon.

Colombo is a city of approximately 300,000 inhabitants with an especially strategic location on the trade route between Europe and the Orient. The installation for the city consists of three exchanges, the principal one being in the Central Telegraph building and the other two being located in special new buildings which have been constructed in the Havelock town and Maradana areas.

The central exchanges, which are of the standard step-by-step type with rotary line switches and a new type No. 2000 selector, are uniform in type and provide for automatic metering of calls and through dialing facilities between the exchange areas. The storage battery supplied for the Central Exchange is the largest ever installed in Ceylon.

To cope with the very humid climate of Colombo, which is only seven degrees from the equator, it has been necessary to provide the apparatus with a special tropical finish and to air-condition the operating rooms of the three exchanges with dehydrating plants which maintain a proscribed humidity at all times.

An interesting fact is that Ceylon, which might be regarded as remote from the fountain heads of progress, had its first telephone only four years after the art was founded by Alexander Graham Bell. Telephony was demonstrated in Ceylon in 1879 and, in 1880, the firm of Alston Scott & Co. ran a telephone line between its office in Colombo and the coffee stores about 2½ miles away.

In the rural districts also the telephone arrived promptly when R. F. Forrest established a telephone connection between the Kendenuwara and Wariapolla plantations near Matale. By 1882 many of the business houses in Colombo installed telephone lines between their offices and coffee stores, and soon an exchange system was established. By 1896 the Colombo exchange had 50 subscribers, and the government was invited to take over the service.

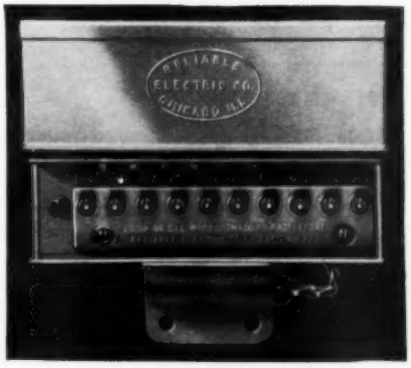
The advent of electric street cars created a serious problem, inasmuch as interference from the electrical ground return of the street car system with the single grounded telephone wires all but ruined satisfactory telephone operation.

The single-wire telephone circuits had to be replaced by the pair wire system, which not only doubled the aerial plant immediately but also caused a rapid growth due to the improvement in the service. By 1904 the aerial plant problem had become acute as the tall poles, carrying hundreds of wires through narrow streets and winding alleys, constituted not only a heavy maintenance problem but also a constant source of danger, particularly during the monsoon season.

JACK RICE has been transferred from the California office of A. B. Chance Co. to New York in charge of the eastern sales branch.

It became necessary to abandon the central exchange and to establish a new exchange of 300 lines to serve subscribers in the Fort area, and another exchange in the Cinnamon Gardens to serve the residential areas.

THE "Reliable" No. 222 CROSSARM ARRESTER



- Ten wire static drain
- "Reliable" sensitive operation
- Weather-tight cover
- Rugged construction
- Long useful service

An essential unit for open wires. Drains static from exposed lines, with direct path to ground. Installed one or two poles from cable end; where drops are over-exposed; and at frequent intervals of one or two miles on all open wire toll leads.

Sample sent on request.

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES

An impassé, which was called Ceylon's "Telephone Muddle," developed, and in 1907 A. H. Preece of the engineering firm of Preece, Cardew and Snell of London journeyed to Ceylon. He recommended and engineered an underground cable system which was completed in 1910.

In the following year an 800-line magneto switchboard was installed, and this was replaced by a much larger board in 1913. During 1915 the equipment for a badly-needed extension of facilities was lost on the "Chantala" which was torpedoed in the Mediterranean. A shipment did get through in 1917 but this only served to alleviate the situation temporarily. Other extensions arrived soon after the world war. The maximum capacity of the switchboard, 3,500 lines, was reached in 1923.

The Central Exchange was relieved again in 1925 by the establishing of a central office in Havelock town, and several auxiliary switchboards were set up at the Central Exchange over the next several years.

Two 50-line units of automatic equipment were shipped to Ceylon in 1923 and placed in service for experimentation. It was the study of this equipment which resulted in several of the measures taken to render automatic equipment fully efficient in the tropics.

All plans for the complete automatic program were ready in 1930, and then came the depression. The project was postponed until 1935 when the installation, which was recently cut into service, was approved.

ARMSTRONG ANNOUNCES

NEW *Whitall Tatum* GLASS INSULATOR

[NO. 15 One-Piece Transposition]

RUGGED • STRONG • IMPROVED THREAD CONSTRUCTION •

HERE is Armstrong's latest contribution to the communications industry. This new insulator supersedes the old style two-piece transposition, used for many years by the Bell System and the independent telephone companies. For complete information, samples, and prices, address your request to Armstrong Cork Company, Glass Insulator Department, 295 Fifth Avenue, New York City.

ARMSTRONG CORK COMPANY
INDUSTRIAL DIVISION
Lancaster Pennsylvania

YOU ARE INVITED
TO ATTEND
THE 35TH ANNUAL CONVENTION
of
THE ILLINOIS TELEPHONE ASSOCIATION
at
HOTEL PERE MARQUETTE, PEORIA, ILLINOIS
JUNE 7-8

INTERESTING PROGRAM FOR TELEPHONE MEN
OPERATORS CONFERENCE
MANUFACTURERS EXHIBITS

BANQUET, DANCE
and
HIGH-CLASS ENTERTAINMENT

DON'T MISS THIS IMPORTANT EVENT

WHATEVER your resistor, volume control, rheostat or attenuator need, it will pay you to come to Resistance Headquarters first. Here you will find a well-equipped, international organization offering a complete line of sizes and types, each one backed with years of specialized experience in the resistance field. Catalog of any desired type on request.

International Resistance Co.
425 N. Broad St., Philadelphia, Pa.

RESISTORS
FOR ALL TELEPHONIC REQUIREMENTS

IRC

Discusses the entire industry!

ELECTRICAL COMMUNICATION

By ARTHUR L. ALBERT
Associate Professor of Communication Engineering
Oregon State College

A study of the various specialized phases of electrical communication as related to the usages of modern communication systems. This book presents not only theory but a discussion of the entire industry. Although not highly mathematical, the treatment is exact, up-to-date, and in accord with the highest engineering standards. The communication engineer will find this book a valuable addition to his working reference library.

448 Pages 6 by 9 $5.00

TELEPHONY PUBLISHING CORPORATION
Telephone Wabash 8604 608 S. Dearborn St., Chicago

Commission and Court Activities

Kansas Commission States Policy on REA Projects

The Kansas Corporation Commission, on May 3, approved the plans, specifications and location of a proposed electric power transmission line to be erected by the Coffey County Rural Electric Cooperative Association, Inc., in the counties of Coffey, Lyon, Greenwood and Woodson, Kans. Approval of the application was given, subject to the jurisdiction of the commission to make such further orders, rules, and regulations as may be necessary to remove undue interference to the service and wires properly constructed on the highways, and also subject to the findings of the commission as set forth in its order.

The commission found during its study of the plans, specifications and location, that the proposed multigrounded wye type electric circuit was to be constructed along highways where certain telephone lines were already in use; and that inductive interference would likely result, which may seriously impair the commercial use of the telephone line.

As a result of this finding the Kansas commission retained jurisdiction in the matter, for the purpose of making such further orders, rules, and regulations as may be necessary to eliminate or reduce any unreasonable interference which may develop.

The commission further found that where communication circuits and electric supply circuits are on the same highway, all communication circuits should be placed on one side of the highway and all supply circuits should be placed on the other side, so that, as far as practicable, one side of any section of a highway will be available as the communication side and one side for the supply side.

The order explicitly stated that unnecessary crossing from side to side of the highway should be avoided; and that, overbuilding or underbuilding of one line by another should be avoided wherever practicable. It should not be done except upon the written permission of the wire-using company involved, or unless expressly authorized by the commission.

The principles of equitable coordination of facilities were stated by the commission as follows:

"In a case where communication circuits occupy both sides of a highway, or where the side occupied by a communication circuit is desired for a supply line, or where the communication circuit makes frequent crossings from one side of the road to the other, then—upon mutual agreement between the communication company and the supply company to transfer any or all portions of such communication circuits to the communication side of the highway—the supply company should remove the communication plant and re-install such plant (or other plant of approximately the same type and extent of construction) in the new location.

The supply company should provide rights-of-way, tree-trimming rights, and tree clearances in the new line location which are satisfactory or equivalent to those enjoyed by the communication company in its present location."

In conclusion the commission stated: "The commission has the power to prescribe reasonable rules and regulations with respect to stringing wire and maintaining wires on the highways of the state, where there is danger or possibility of unreasonable interference to the wires of one utility by those of another utility, but the commission does not have the power to assess damage in favor of one utility as against another.

"Electric transmission companies and telephone companies have the right to the use of the public highways in this state, but neither has the right to use such highways to the exclusion of the other. It is, therefore, the duty of any utility company using the highways for transmission purposes, to construct its line according to the best known methods to prevent interference."

▼ ▼

Pennsylvania Bell Appeals Intrastate Case

Filing an appeal with the Pennsylvania Supreme Court, the Bell Telephone Co. of Pennsylvania seeks to overthrow the decision of the state superior court which sustained the rate order of the Pennsylvania Public Utility Commission reducing intrastate toll rates by approximately $600,000 a year (TELEPHONY of April 22, page 24). If the case ultimately reaches the U. S. Supreme Court, the question may be determined as to whether a state com-

A large-capacity, protected cable terminal of extra-strong, durable construction, having heavily galvanized hood. Each pair of protectors consists of two 5-ampere Type 17 wood fuses and two Type 2105 discharge blocks. Available in capacities of 11, 16 and 26 pairs, with or without cable stub. Write for further information on this and other Sands protective devices.

SANDS PROTECTION EQUIPMENT
is made by:

AUTOMATIC ELECTRIC COMPANY

Distributed by:
AMERICAN AUTOMATIC ELECTRIC SALES CO.
1033 West Van Buren Street, Chicago
Export Distributors:
AUTOMATIC ELECTRIC SALES COMPANY, LTD.
Chicago

mission can use interstate rates as a measure for intrastate rates over the same lines.

No allegation was made by the Pennsylvania Bell that the reduction would bring rates to a confiscatory level, but its appeal to the courts claimed that the commission order was made without supporting evidence as to the value of property and rate of return, hence was arbitrary and without due process of law, constituting an interference with interstate commerce.

Following negotiations with the Federal Communications Commission, the American Telephone & Telegraph Co. effected toll rate reductions on January 15, 1937. When the Pennsylvania Bell did not make corresponding reductions, the state commission launched an investigation which resulted in an order March 15, 1938, for the Bell company to reduce intrastate toll rates to the level of the interstate rates of the A. T. & T. Co.

The Pennsylvania Bell company supports its court case principally upon the Eubank case (184, U.S. 27) in which the supreme court held the Kentucky long and short haul law as unconstitutional because it made interstate rates a maximum measure for shorter intrastate rates.

EVERSTICK ANCHORS...
FIRST
In Dependability and Safety!
Made of Malleable Iron—proven on the toughest guying jobs—you can't go wrong by using Eversticks exclusively.
THE EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA
Nut Housing locks EVERSTICK firmly on rod.
POWER TO HOLD

ANSWERS TO TRAFFIC QUESTIONS ON PAGE 19

1. The report charge is made for the attempt to complete the call. This attempt required the use of the telephone company's facilities and its employes' time.
2. This is the terminating toll center operator's responsibility.
3. If the charge is accepted, "OK" is entered following the number in the calling "telephone number space."
4. "WH(time)" is entered on the back of the ticket. If the WH report includes the words "at(no.)" understand that the called party has reported ready to talk from a station other than the called station. In this case enter "wh at (no.) (time)" on the back of the ticket.
5. All collect calls *are not* subject to the person-to-person rate. Collect station-to-station calls are not subject to the person-to-person rate. However, if the calling party asks you to reverse the charge on a station-to-station call and the day rate for a paid call is 20 cents or less, the call will take the corresponding "special collect" station-to-station rate.

However, the state superior court felt the Eubank opinion is no longer guiding and ruled that the commission properly applied the provisions of the state's statute prohibiting any company to receive a greater rate for the transmission of a message or conversation for a shorter than for a longer distance over the same line or route.

In the event of an appeal to the U. S. Supreme Court, there might be a ruling on the right of the federal government to require intrastate rates to be raised to conform to interstate rates without inquiry into the reasonableness of the intrastate rates before such an increase and whether this power is correlative to a right on the part of the state to require intrastate rates to be lowered to conform to interstate rates, also without an inquiry into the justness of such intrastate rates, except in comparison with existing interstate charges.

One-Man Commission Proposed in Wisconsin

A reorganization measure to abolish the three-member Wisconsin Public Service Commission and to set up a single-man directorship was reported favorably for passage May 3 by the state senate committee on corporations and taxation.

At a hearing May 3, the measure was opposed by representatives of railroad trainmen and briefly supported by two Republican senators.

Speaking in favor of the measure to reorganize the commission, Sen. Kenneth S. White explained most of the work is done by the commission staff "and all you need is a good administrator to see that the staff does its work."

A bill is pending in the senate to set up a board of review to hear appeals from the commission. This "disinterested board will be separate from the commission and will hear appeals," Sen. White continued.

Sen. Morvin Duel explained the bill merely changes the three-man commission to a one-man commission and the amendment he introduced provides for civil service for employes.

Fred S. Hunt, chairman of the present commission, outlined the scope of the commission's work and said: "The Wisconsin commission is regarded as one of the best in the United States, if not the best. Whatever may be your opinion of the commissioners, we have a high-class staff."

In answer to a question by Sen. Michael Kresky Jr., Mr. Hunt said eight states have five-man commissions; 35 states have three-man commissions and only four states have one-man commissions.

Summary of Commission Rulings and Hearings

Federal Communications Commission Washington, D. C.

May 16: The Chesapeake & Potomac Telephone Co. of Virginia given authority to supplement existing facilities between Leesburg and Middleburg, Va.

May 17: Edwin M. Blakeslee authorized under Sec. 212 of the Communications Act of 1934, to hold position as director of the Indiana Associated Telephone Corp. and the Michigan Associated Telephone Co.

Illinois Commerce Commission

May 19: Commission completed hearing of evidence and took under ad-

visement the application of the Illinois Allied Telephone Co. to increase its rates $21,000 annually in 11 Bureau County towns. The company and objectors were instructed to file briefs for the commission's scrutiny.

May 25: Hearing in Chicago on complaint of Attorney Alfred O'Connor of Chicago, asking that the Illinois Bell Telephone Co. be required to show cause why it should not print its directories in larger type.

Michigan Public Service Commission

April 26: Tariff schedule No. 1 of the Pullman Mutual Telephone Co. approved.

April 26: Tariff schedule No. 1 of the Bloomingdale Telephone Co. approved.

May 11: The Michigan Bell Telephone Co. authorized to establish the Southfield zone within the Detroit district exchange, to be comprised of the territory between the eight-mile and 12½-mile roads, and between Inkster and Greenfield roads; with the following schedule of rates:

Business individual $4.00; residence individual $2.75; residence two-party $2.00; business rural four-party, $3.50; residence rural four-party $2.00; business extension $1.00; and, residence extension, 50 cents.

Missouri Public Service Commission

May 17: Application filed by Howard Smith for authority to purchase the Mooresville telephone system in accordance with the terms of a bill of sale, copy of which was attached to the application. Case No. 9725.

Nebraska State Railway Commission

May 16: Application of the Northwestern Bell Telephone Co. for authority to make certain changes in miscellaneous tariffs, including elimination of extra charge of 10 cents a month for handsets, found reasonable and granted as asked.

May 16: Request of the Hamilton County Farmers Telephone Association for authority to continue in effect for one year present emergency rates expiring July 1, granted as asked. It appeared to the commission that the company is operating at a loss.

May 16: Application of the Central Nebraska Telephone Co. for authority to limit free service to two exchanges, and to establish toll charges between Brady and Maxwell exchanges and Hamlet and Hayes Center exchanges, found reasonable, and granted as asked.

May 16: Application of the Lincoln Telephone & Telegraph Co. for authority to close exchange at Gilead, granted on condition that subscribers be given choice between service at Hebron or Alexandria exchanges at rates governing those exchanges.

June 2: Hearing in Lincoln on application of the Lincoln Telephone & Telegraph Co. for authority to discontinue its exchange at Nora.

Ohio Public Utilities Commission

May 15: Approval given to maps which have been filed, showing the boundaries of the following exchanges, providing that the filing shall not affect or infringe the service of any subscribers and with a reservation of the right to make necessary or proper revisions:

The Lorain Telephone Co., Vermillion and Birmingham; Athens Home Telephone Co., Chauncey; Darrtown Telephone Co., Darrtown; Carey Electric Telephone Co., Carey; Vanburen Mutual Telephone Co., Vanburen; Fayette Telephone Co., Fayette; College Corner Telephone Co., College Corner; Ohio Standard Telephone Co., Pomeroy, Bloomville, Oxford and Wharton; Morning Sun Telephone Co., Morning Sun; United Telephone Co., Quincy, DeGraff, Belle Center, Marysville, East Liberty and West Liberty.

Ohio United Telephone Co., Camden; Northern Ohio Telephone Co., Berling Heights, Ashley, Bellevue, North Baltimore, Wakeman, Granger and Valley City; Ohio Associated Telephone Co., Pioneer, Montpelier, Edon, Pleasant City, Belle Valley and Nevada; and Ohio Bell Telephone Co., Glenford, Findlay, Perrysburg, Upper Sandusky, Somerset, Nelsonville, Chesterland, Sugar Grove, Roseville, Shawnee and Rushville.

May 17: The Ohio Bell Telephone Co. authorized to amend its toll rate and rate guide, effective June 23 to show that the new consolidated Magnolia-Waynesburg exchange will serve Magnolia, Waynesburg, Sparta and Sandyville.

May 17: The Ohio Associated Telephone Co. authorized to file new schedules, effective June 1, revising rates at its exchanges in Baltic, Berlin, Sugar Creek, Warsaw, Mineral City, Freeport, Cooperdale, and Chili.

In Baltic, Berlin, Sugar Creek and Chili the rates for telephone service were revised as follows: Business independent, $2.00 to $3.25; business two-party, $1.75 to $2.75; business four-party, $1.50 to $2.25; business rural, $1.25 to $2.25; residence independent, $2.00 to $2.25; residence two-party, $1.75 to $2.00; residence four-party, $1.50 to $1.75; and, residence rural, $1.25 to $1.75.

In Warsaw, Mineral City, Freeport and Cooperdale the revised rates ranged from increases of 75 cents for business independent to reductions on residence independent of 25 cents.

Washington Department of Public Service

May 13: The Pacific Telephone & Telegraph Co. filed a proposed upward rate revision covering service in the state outside Seattle. An application for a rate revision within the Seattle metropolitan area already is under consideration by the department. The new schedule would increase the company's net revenue by about $1,225,000. The company pointed out that its rate of return has not exceeded 2.5 per cent in the last five years, while annual payrolls have increased 55 per cent and taxes 49 per cent.

Wisconsin Public Service Commission

May 18: Continued hearing in Berlin on the alleged refusal of the Berlin Telephone Co. to extend service to applicants in Seneca and Marion. Further hearing was required because negotiations for the purchase of a portion of the Wisconsin Telephone Co.'s lines in the areas affected by the Berlin company have not been successful.

June 6: Hearing in Madison in the commission's investigation of the Commonwealth Telephone Co.'s plan to eliminate free toll service from its exchanges in Ithaca, Lime Ridge, Loganville, Plain, Reedsburg, Ridgeway, Spring Green and Witwen.

It Will Pay

to ALWAYS Order

Genuine

Ironite

DROP WIRE

Because —

1. IRONITE is strong—The Paragon Formula pure iron conductor—double "Crapo" galvanized—has a tensile strength of 170 lbs.
2. IRONITE is flexible—This special conductor metal assures freedom from wind crystallization together with ease of working.
3. IRONITE Insulation is 30% specification rubber, testing up to 10 times the usual required resistance. Perfect centering of conductor is assured by Paragon continuous vulcanizing process.
4. IRONITE Braid is stearine pitch, mica impregnated to add years to its life. Unequalled in durability.
5. IRONITE is easiest to install. Black and white rubber for tracers.
6. IRONITE splices to any line perfectly.

NOW...

Compare the Prices

	Twisted Pair 19 B.W.G.*	18 B.W.G.*
Up to 1000 feet	$10.50	$11.80
1000 to 5000 feet	9.35	10.45
5000 to 10000 feet	8.75	9.80
10000 to 25000 feet	8.25	9.25
25000 to 100000 feet	7.95	8.90
	Parallel Pair	
Up to 1000 feet	9.55	11.20
1000 to 5000 feet	8.45	9.95
5000 to 10000 feet	7.95	9.30
10000 to 25000 feet	7.45	8.75
25000 to 100000 feet	7.20	8.45

F.O.B. Mill Subject to standard Fgt. Adders.
*19 BWG=17 B&S—18 BWG=16 B&S.

THEN...

You Will Want to

Order your full season's supply of money-saving — service-improving

GENUINE IRONITE

from your supply house or from

Paragon Electric Co.

37 W. Van Buren St. Chicago, Ill.

Open Wire Telephone Plant (Cont.)

There are three basic types of wire available for the open wire plant: (1) Galvanized iron or steel wire; (2) hard drawn copper wire; and (3) Copperweld wire.

Types of Wire Used in the Open-Wire Plant

Iron or steel wire is the most widely used for rural, and minor toll circuits. For high-grade toll circuits and on rural circuits where it is desired to render a superior grade of transmission, copper wire is used.

Copperweld wire consists of a steel core with an outer covering of copper. This wire costs less than pure copper wire and offers the advantage of unusually high tensile strength, freedom from corrosion, and fair transmission (better than iron, but not as good as copper). Copperweld wire is particularly useful in areas where corrosion due to smoke or other causes, is unusually rapid. It is also well suited to severely exposed leads and, for that matter, for general construction anywhere.

Galvanized iron or steel wire is available in several different grades, having different tensile strengths. The most common type in use for rural circuits has been size .109 (No. 12 gauge) B.B. iron. However, a new high tensile strength steel wire is now available which

BERNZ FIREPOTS, TORCHES & TOOLS FOR EFFICIENCY AND ECONOMY

To insure greater efficiency and lower costs, telephone mechanics must use quality tools. BERNZ tools serve public utilities throughout the world. They are always dependable.

Cablemen's Firepots, Blow Torches, Sprayers, Pole Bleeding Torches, Cable Dressers, Drift Plugs, Scrapers, Tap Borers, Solder Pots, Ladles, Solder Coppers, Wiping Cloths, etc.

WRITE FOR COMPLETE CATALOG.

No. 52 FIREPOT
1 GALLON
GASOLINE or KEROSENE

OTTO BERNZ CO. Inc.
ROCHESTER, N. Y.
Estab. 1876

No. 500A—1 QUART
No. 250A—1 PINT

Size B.W.G.	Diam. (Inch)	Breaking Load (Lbs.)	Weight (Lbs. per Mile)	Resistance (Ohms per 1000 Ft.)
4	.238	2,271	811	1.35
6	.203	1,652	590	1.86
8	.165	1,092	390	2.82
9	.148	879	314	3.50
10	.134	722	258	4.26
*12	.109	476	170	6.46
14	.083	277	99	11.10

*Recommended size for telephone line wire.

Table No. 1. Mechanical and resistance characteristics of B.B. iron wire.

permits either longer spans, or a greater safety factor with spans of the usual length.

The breaking strength of .109 B.B. iron wire is about 476 pounds whereas the new wire has a strength of 1,213 pounds. This permits spans as great as 350 feet in heavy loading areas and 450 feet in medium loading districts and 500 feet in light loading areas.

Most telephone companies have standardized as to wire sizes on .109 (No. 12 B.W.G.) iron or steel wire, .104 (No. 12 N.B.S.) copper wire, and .102 (No. 10 A.W.G.) Copperweld wire; in the light loading areas .083 (No. 14 B.W.G.) iron, .080 (No. 14 N.B.S.) copper wire, and .081 (No. 12 A.W.G.) Copperweld wire. In heavy loading areas where there is a severe exposure to prevailing storms and ice loads are fre-

Size	Diam. (Inch)	Breaking Load (Lbs.)	Weight (Lbs. per Mile)	Resistance (Ohms per 1000 Ft.)
4 (A.W.G.)	.2043	1,970	667.1	0.2584
8 (B.W.G.)	.1650	1,326	435.1	0.3961
6 (A.W.G.)	.1620	1,280	419.6	0.4108
7 (A.W.G.)	.1443	1,030	332.7	0.5181
10 (N.B.S.)	.1285	826.	263.9	0.6533
9 (A.W.G.)	.1144	661.2	209.3	0.8238
*12 (N.B.S.)	.104	550.4	172.9	.9971
10 (A.W.G.)	.1019	529.2	165.9	1.039
14 (N.B.S.)	.0808	337.0	104.4	1.652

*Recommended size for telephone line wire.

Table No. 2. Mechanical and resistance characteristics of hard-drawn copper wire.

Size A.W.G.	Diam. (Inch)	Breaking Load, Lbs. 40% Cond.	Breaking Load, Lbs. 30% Cond.	Weight (Lbs. per Mile)	Resistance (Ohms per 1000 Ft.) 40% Cond.	Resistance (Ohms per 1000 Ft.) 30% Cond.
4	.2043	3,541	3,934	612	.6337	.8447
5	.1819	2,938	3,250	485	.7990	1.065
6	.1620	2,433	2,680	384	1.008	1.343
7	.1443	2,011	2,207	305	1.270	1.694
8	.1285	1,660	1,815	242	1.602	2.136
9	.1144	1,368	1,491	192	2.020	2.693
*10	.1019	1,130	1,231	152	2.547	3.396
11	.0907	896.3	—	121	3.212	—
12	.0808	710.8	—	96	4.051	—

*Recommended size for telephone line wire.

Table No. 3. Mechanical and resistance characteristics of Copperweld line wire.

quent, .134 (No. 10 B.W.G.) iron, .128 (No. 10 N.B.S.) copper and .128 (No. 8 A.W.G.) Copperweld are frequently used to provide increased strength and to insure continuity of service during storm conditions.

For most exchanges and circuits the following sizes are recommended as worthy of standardization:

Iron or steel wire..... .109 (No. 12 B.W.G.)
Copper wire ..... .104 (No. 12 N.B.S.)
Copperweld wire ..... .102 (No. 10 A.W.G.)

It should be noted that it is preferable to refer to wire sizes by their diameter in mils rather than by gauge. For example when we say " a .109 iron wire," we mean a wire whose diameter is 109 thousandths of an inch in diameter.

Accompanying tables give mechanical and resistance characteristics of the several types and sizes of wire.

Type	Size B.W.G.	Diam. (Inch)	Breaking Load (Lbs.)	Weight (Lbs. per Mile)	Resistance (Ohms per 1000 Ft.)
Crapo HTL-135	12	0.109	1213	170	7.25
Crapo HTL- 85	14	0.083	460	99	11.10
Crapo HTL- 85	12	0.109	793	170	6.45
Crapo HTL- 85	10	0.134	1199	258	4.25
Crapo HTL- 85	9	0.148	1462	314	3.50

Table No. 4. Mechanical and resistance characteristics of new high strength steel wire.

Obituaries

ASHER MARTIN BENEDICT, manager-owner of the Richards (Mo.) Telephone Co. and president of the Missouri Telephone Association, suffered a heart attack Monday afternoon, May 8, and died 15 minutes later. The

A. M. BENEDICT, manager-owner of the Richards (Mo.) Telephone Co. and president of the Missouri Telephone Association, died suddenly of a heart attack May 8. He had served 40 years in the telephone business and was an officer of the association for 26 years.

funeral service was held May 10 at the Presbyterian church in Richards.

With 40 years of service in the field—26 years as an officer of the Missouri Telephone Association—Mr. Benedict took his place as a pioneer in the art of Independent telephony. He rarely missed a state convention and attended the national convention whenever possible.

He had served as vice-president of the Missouri association for the past several years and was elected president at this year's meeting (TELEPHONY of April 15).

Born in Fort Scott, Kans., September 16, 1875, Mr. Benedict at an early age showed an aptitude for mechanics. He served as a farm hand for a time but entered the coal mining industry in 1895 which was a successful undertaking. However, the telephone business strongly appealed to him and in 1899 he became groundman and lineman for the Missouri & Kansas Telephone Co. in his home town of Fort Scott.

In December, 1904, Mr. Benedict became manager of the Hume Telephone Co., Richards, Mo., and in May of the following year he purchased the property which he has operated continuously ever since as owner and manager under the name of the Richards Telephone Co.

From 1918 to 1919 Mr. Benedict served as local manager for the Southwestern Bell Telephone Co. at Fort Scott and then returned to Richards to devote his time to his own properties. His company was among the first to demonstrate that 24-hour metropolitan service can be successfully given in a small town and rural community. He acquired a thorough appreciation and understanding of the problems of the telephone company serving the small community.

Mr. Benedict felt that the public needs to be enlightened by the press of the country in regard to the communications industry of the country, particularly the small town telephone plant which is finding it so difficult—if not impossible—to make ends meet. He was on good terms with his local newspaper and often supplied information to it bearing on telephone matters.

One of the most outstanding citizens of Richards, Mo., Mr. Benedict had been executive secretary of the Richards Commercial Club since 1915. He was a member of the local Presbyterian church and served as its treasurer for many years as well as clerk of the official board.

Mr. Benedict was secretary of the board of education for five years and for three years he directed the local band and orchestra. In addition to being a 32nd degree Mason, he served as master of the local Masonic lodge from 1930 to 1934.

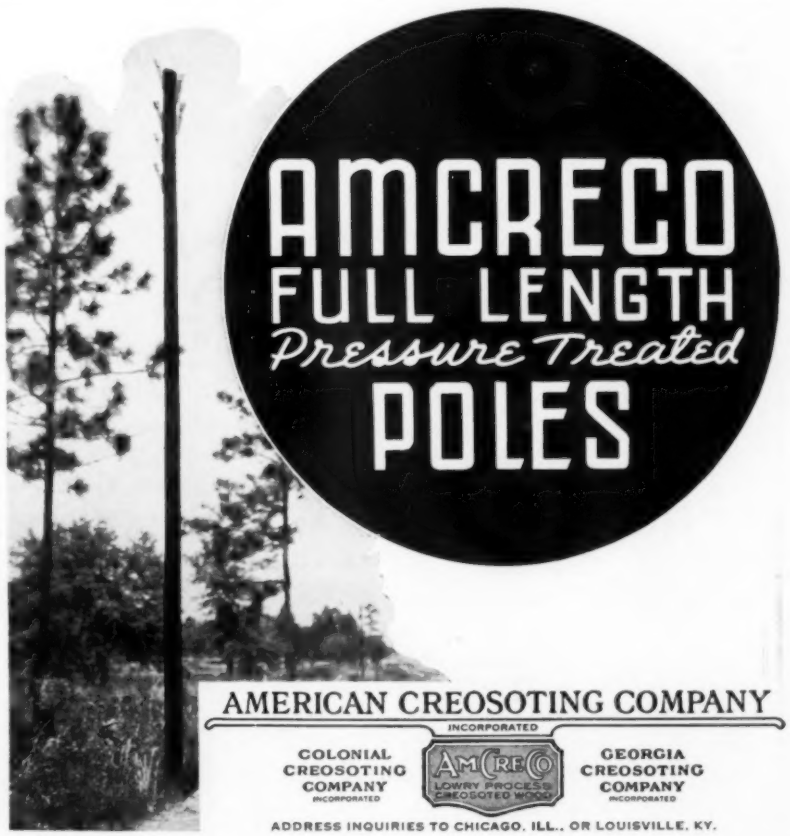
His many friends will be grieved to learn of his sudden and untimely death. The Independent telephone industry has lost one of its most staunch supporters, and the Missouri Telephone Association will miss him as one of its most able and loyal members.

▼ ▼

CLARENCE H. McKAY, age 65, residing near New Burlington, Ohio, died at McClelland Hospital, Xenia, Ohio, recently after an illness of two months.

He had been a stockholder in the New Burlington Telephone Co. since its beginning in 1910, and its president and general manager for the past three years. Previous to this, he was president and owner of the Port William Telephone Co. for 15 years.

Mr. McKay was very active in the community life in which he lived. He was a member of the official board of the Methodist Church, Scottish Rite



CLASSIFIED SECTION

Rates 10 cents per word payable in advance. Minimum charge $2.00 for 20 words or less.

QUALITY WIRE *And* CORD

Since 1900

Distributed and guaranteed by GraybaR

WHITNEY BLAKE CO.

NEW HAVEN, CONN.

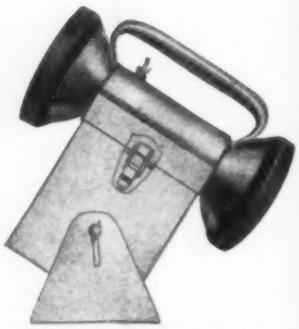
MASTER-LIGHTS

- HIGH POWER HAND SEARCHLIGHTS.
- HIGH POWER HAND FLOODLIGHTS.
- HIGH POWER AUTOMOBILE SPOTLIGHTS.
- HIGH POWER SEARCHLIGHTS BUILT SPECIALLY FOR TRUCKS.
- ROOF MOUNTED AUTO SEARCHLIGHTS.
- HIGHWAY ACCIDENT WARNING LIGHTS.
- EMERGENCY CAR WARNING LIGHTS.
- WIG-WAG WARNING LIGHTS FOR FIRE. POLICE AND AMBULANCES.
- RECHARGEABLE BATTERY-LIGHTS — DRY BATTERY-LIGHTS.
- EMERGENCY SEARCHLIGHTS AND FLOOD-LIGHTS.
- PORTABLE — WATCHMEN'S — REPAIR — FIRE — POLICE LIGHTS.

—Order on Approval—

CARPENTER MFG. CO.

SIDNEY ST. CAMBRIDGE, MASS.



New T&T 2-way light for linemen

New Style Stewart Test Sets

Have detector coil for telling direction and lamp for telling distance to trouble. Sent on trial. Price

$36.00

STEWART BROS. Ottawa, Ill.

POSITION WANTED

POSITION WANTED: Thoroughly trained man, 20 years' experience, inside and outside plant maintenance, construction, station installation, magneto and common battery. Good references. Address 8808 care of TELEPHONY.

RECONDITIONED

DESK STANDS

KELLOGG No. 28, 84, 97, 118

STROMBERG-CARLSON No. 986, 988, 992, 1168, 1176

W.E. CO. 1020-AL, 1040-AL, 50-AL

A.E. CO. Type 21, offset base

A.E. CO. (MONARCH) No. 21 center stem

Write for circulars.

BUCKEYE TELEPHONE and SUPPLY COMPANY

COLUMBUS, OHIO

SPECIALISTS IN

Rebuilding and Repairing

TRANSMITTERS

Local or Common Battery transmitters rebuilt. New Granular Carbon, baked enamel or nickled fronts 50c

Ringer Coils, drop coils and generator armatures rewound.

Desk Stands rebuilt.

Old style wall phones rebuilt and modernized into late type wall or desk sets.

We offer the best type of rebuilt wall phones, desk sets and cable terminals.

Bargains in slightly used pole line hardware and insulators.

FREE BULLETIN SENT ON REQUEST

NEW desk stand and switchboard cords, receiver shells and mouthpieces.

NEW Oak telephone cabinets.

Telephone Repair Co.

Daniel H. McNulty, Manager

Rogers Park Station Chicago

HELP WANTED

POSITION AVAILABLE

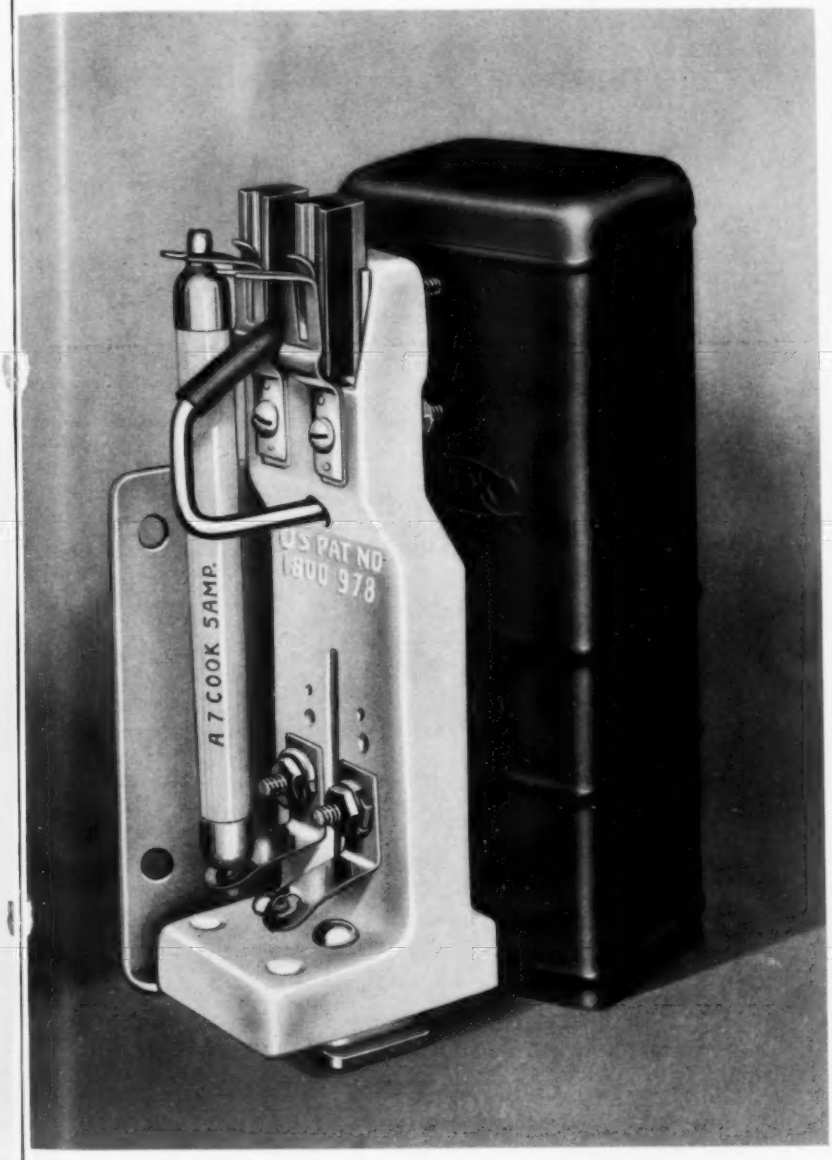
An internationally known telephone manufacturer is seeking the services of a copywriter with technical publications experience in the telephone industry. In reply please state former employers, age, education and salary expected. Address 8809 care of TELEPHONY.

FOR SALE

FOR SALE: Miscellaneous Kellogg, Stromberg-Carlson, American Electric and Western Electric Company, 3, 4 and 5-bar desk and wall type magneto telephones. Write for prices. Address, The Columbia Telephone Co., Columbia, Pa.

FOR SALE: Small automatic exchange; growing summer resort, ideal location, on Inland Sea. Optional: Six-room modern cottage, water works; additional property for subdivision. Address 8807 care of TELEPHONY.

PROTECT SUBSCRIBERS with COOK "O" Type Sub-Station Protectors



Subscribers naturally assume that you have provided protection that will keep high potentials out of the house.

Be sure—protect with Type "O," a high quality sub-station protector for both outdoor and indoor use.

Mounted outdoors, it is available to maintenance men at all times—an extra advantage and one reason for low maintenance costs.

Choose Type "O" for the same reasons that have made it a world-wide favorite—its quality materials, correct design, precision workmanship and dependable performance.

★ COOK ★

COOK ELECTRIC CO., 2700 SOUTHPORT AVE., CHICAGO

FLOTE' in STEEL-GLASS

Fayetteville, N. C.
Exchange Equipped with
48V—384 A.H. PHILCO Flote
in Steel-Glass Battery—Type 9FF

The Carolina Telephone & Telegraph Co. has 48 Philco Equipped Exchanges

FLOTE' IN STEEL-GLASS CONSTRUCTION

Chemical—Floté cells maintain a higher C. E. M. F. throughout their long life — and, therefore, require and take 60% as much current (and water) as conventional designs. Floté life is *DOUBLE* that of the ordinary battery.

Mechanical—Spray-proof Steel-Glass construction supports the plates on molded ribs and wedges the element in monobloc form, lengthening battery life and insuring trouble free economical service.

Again Philco Floté in Steel-Glass has been selected by telephone engineers to provide dependable service at lowest cost. The Carolina Telephone & Telegraph Co.'s Fayetteville, N. C., exchange is Philco equipped for long life and efficiency.

PHILCO BATTERY DIVISION
TIOGA & C STREETS PHILADELPHIA, PA.
OFFICES IN PRINCIPAL CITIES

Telephony

The Journal of the Telephone Industry

★

Published by
TELEPHONY PUBLISHING CORP.
608 So. Dearborn Street, CHICAGO
Telephone Wabash 8604

H. D. FARGO, President and Treasurer
S. R. EDWARDS, Editor and Secretary
H. D. FARGO, JR., Vice-President and Advertising Manager
D. C. SORENSEN, Western Advertising Manager

Subscription — 10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

Vol. 116 June 3, 1939 No. 22

IN THE NATION'S CAPITAL—*By Francis X. Welch* 9
PENNSYLVANIA ESTABLISHES NEW RECORD FOR ATTENDANCE AND ENTHUSIASM 11
FATHERS AND SONS IN THE INDEPENDENT TELEPHONE INDUSTRY 14
MERCHANDISING OF TELEPHONE COMPARED WITH OTHER INDUSTRIES—*By John H. Wright* 17
INDEPENDENT TELEPHONY IN NEW YORK STATE *By Stanley R. Edwards* 20
KELLOGG ELECTS NEW PRESIDENT AND SECRETARY 27
COMMISSION AND COURT ACTIVITIES 30
COMING CONVENTIONS 31
"*TELEPHONY'S*" ENGINEERING DATA—*By B. C. Burden* 32